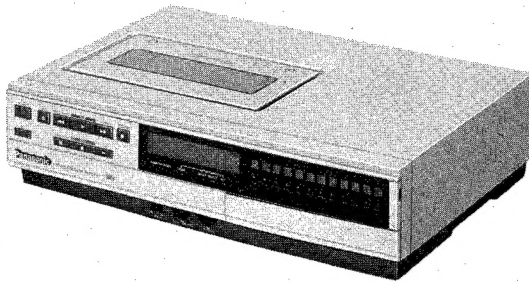
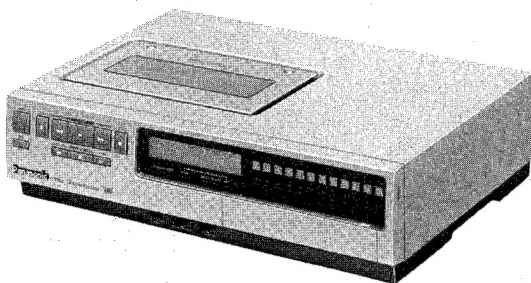


Service Manual

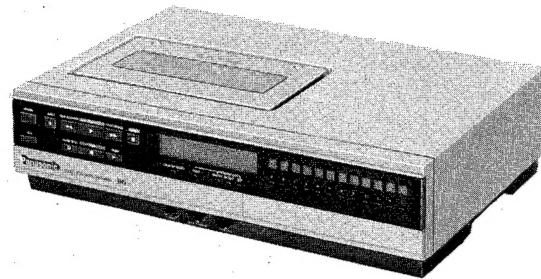
Video Cassette Recorder

Panasonic
 Omnivision **VHS**
PV-1230
PV-1222
PV-1225


PV-1230



PV-1222



PV-1225

Vol. 1*Summary***Vol. 2**
*Mechanical
Adjustment
Procedures
Electrical
Adjustment
Procedures*
Vol. 3*Block Diagrams***Vol. 4**
*Schematic
Diagrams
Printed Circuit
Board Diagrams*
Vol. 5
*Exploded Views
Replacement
Parts List*
VHS
Panasonic®

 Matsushita Engineering Service Company
 Division of Matsushita Electric Corporation of America
 50 Meadowlands
 New Jersey 07070

 Panasonic Hawaii Inc.
 91-238 Kauhli St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

 Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

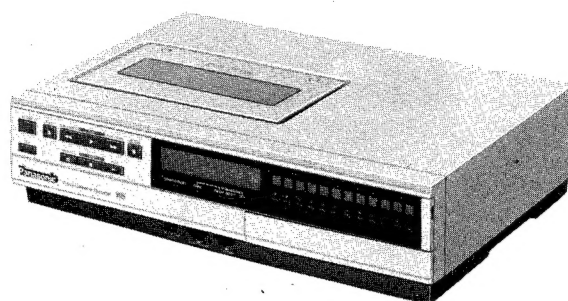
 Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Infanteria, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

 07200041
 SA-DV-1230
 SERVICE XE

Service Manual

Vol. 1

Summary

Panasonic
OmniVision **VHS**
PV-1230
PV-1222
PV-1225


SPECIFICATIONS

Power Source: 120 V AC $\pm 10\%$, 60 Hz $\pm 0.5\%$
 Power Consumption: Approx. 18 watts
 Television System: EIA Standard (525 lines, 60 fields)
 NTSC color signal

Video Recording

System: 2 rotary heads, helical scanning system
 Luminance: FM azimuth recording
 Color signal: Converted subcarrier phase shift recording

Audio Track: 1 track
 Tape Format: Tape width 1/2" (12.7 mm), high density tape

Tape Speed: SP mode: 1-5/16 i.p.s. (33.35 mm/s)
 LP mode: 2 1/32 i.p.s. (16.67 mm/s)
 SLP mode: 7/16 i.p.s. (11.12 mm/s)

Record/Playback Time: 8 HRS. with 160 min. type tape used in SLP mode

FF/REW Time: Less than 6 min. with 120 min. type tape

Heads: Video: 2 rotary heads
 Audio/Control: 1 stationary head
 Erase: 1 full track erase
 1 audio track erase

Input Level: Video: VIDEO IN Jack (RCA type)
 1.0 Vp-p, 75 Ω unbalanced
 Audio: AUDIO IN Jack (RCA type)
 -20 dB, 50 k Ω unbalanced

TV Tuners: VHF Input: VHF Ch2-Ch13,
 75 Ω unbalanced
 UHF Input: Ch14-Ch83,
 300 Ω balanced

Output Level: Video: VIDEO OUT Jack (RCA type)
 1.0 Vp-p, 75 Ω unbalanced
 Audio: AUDIO OUT Jack (RCA type)
 -6 dB, 600 Ω unbalanced

RF Modulated: Ch3/Ch4 switchable,
 72 dB μ , (Open Voltage)
 75 Ω unbalanced

Video Horizontal

Resolution: Color: more than 230 lines
 B/W: more than 230 lines

Audio Frequency

Response: SP mode: 100 Hz ~ 8 kHz
 (10 dB down) LP mode: 100 Hz ~ 6 kHz
 SLP mode: 150 Hz ~ 5 kHz

Signal-to-Noise Ratio: Video: SP mode: better than 41 dB
 LP mode: better than 41 dB
 SLP mode: better than 41 dB
 (Rohde & Schwarz noise meter)
 Audio: SP mode: better than 42 dB
 LP mode: better than 40 dB
 SLP mode: better than 40 dB

Operation

Temperature: 41°F—104°F (5°C—40°C)
 Operating Humidity: 10%—75%
 Weight: 13.0 lbs. (5.9 kg)
 Dimensions: 16-15/16" (W) \times 11-5/8" (D) \times 4-1/4" (H)
 (430 mm \times 295 mm \times 108 mm)

Accessories Supplied: • Remote control unit
 • VHF connecting cable
 • 300 Ω —75 Ω transformer
 • Twin-lead cable

Available Tapes:

1/2" VHS video cassette tapes
 NV-T160 Approx. 1073 ft. (327 m), 160,
 320, or 480 min.
 NV-T120 Approx. 810 ft. (247 m), 120, 240,
 or 360 min.
 NV-T60 Approx. 417 ft. (127 m), 60, 120,
 or 180 min.

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

Panasonic®

Matsushita Engineering & Service Company
 Division of Matsushita Electric
 Corporation of America
 50 Meadowland Parkway, Secaucus,
 New Jersey 07094

Panasonic Hawaii Inc.
 91-238 Kauhū St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

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 Ave. 65 De Infanteria, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

INTRODUCTION

This Service Manual contains information which will allow the service technician to understand and service the Panasonic VHS recorder Models PV-1230, PV-1222, PV-1225 and the various accessories that complement the deck.

For a detailed technical explanation, please refer to the Training Manual on these models.

Some of the Features incorporated in these models are: soft touch controls, 12 position Electronic Tuner, 2 week/1 program Timer, Wired Remote Control (PV-1230: 5F, PV-1222/PV-1225: 1F), One Touch Record Button (O.T.R), Picture Search in SP, LP and SLP, STILL Picture in SLP, Light Editing, Auto Rewind, Frame Advance in SLP, SLOW Picture in SLP.

These 3 models use a multi-function display indicator which combines indicators for time, tape counter, speed, transport functions, and timer record into one easy to read digital display.

The above features plus the VHS format make the PV-1230/PV-1222/PV-1225 table top VCR's an excellent unit for your enjoyment.

Just slightly ahead of our time...Panasonic

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SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $1\text{M}\Omega$ and $5.2\text{M}\Omega$. When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

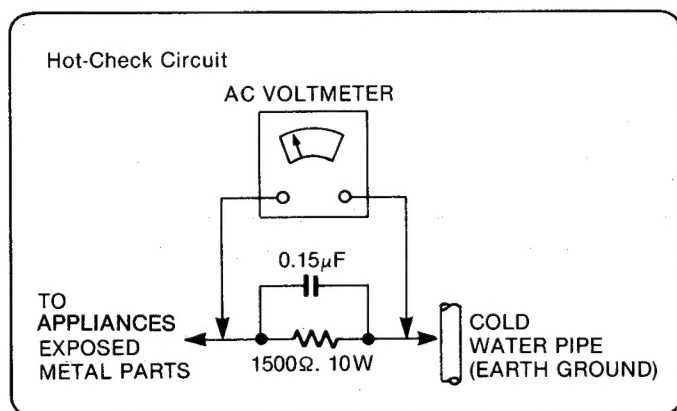


Figure 1

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5\text{k}\Omega$, 10 watts resistor, in parallel with a $0.15\mu\text{F}$ capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed $1/2$ milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

"NOTE to CATV system installer:

This reminder is provided to call the CATV system installer's attention to Article 820-22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical".

FEATURES

Your Panasonic VCR has these special features to enhance your viewing enjoyment.

Watch one channel while recording another

Fine-editing

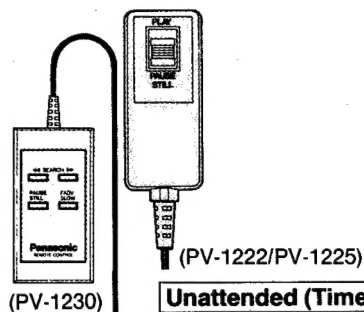
Cable-ready

(Only PV-1230)

Multi-motion playback

- Fast Search
- Still picture
- Frame Advance
- Slow-motion

Remote Control



Unattended (Timer) Recording

Up to Eight-hour recording

Extended Time One Touch Recording (240 MIN)

► PV-1230/PV-1222/PV-1225 Comparison Chart

FEATURES	PV-1230	PV-1222	PV-1225
STILL	SLP		
FRAME ADVANCE	SLP		
SLOW	SLP		
SEARCH	SLP (×9)		
PROGRAM	2 week/1 program		
ONE TOUCH RECORDING	4 hours		
TUNER	12 position		
CHNNEL	107ch	82ch	82ch
WIRED REMOTE CONTROL	5 functions	1 function	1 function



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

DESCRIPTION OF CONTROLS

TOP and FRONT

• RESET BUTTON

Pushing this button causes the Tape Counter to return to "0000". By beginning the recording at "0000", subsequent playback will be more convenient.

• TIMER BUTTON

This button is used to put the VCR in Unattended Recording mode after programming functions have been completed.

When this button is ON, "□" appears on the Multi Function Display, and you will not be able to operate the unit manually.

• CHANNEL SELECTOR BUTTONS/INDICATOR LIGHTS

Select the channel (2~83, A~W, A-2, A-1) you wish to view or record by pushing any one of these 12 buttons.

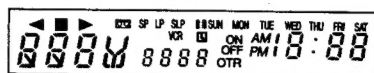
• CASSETTE HOLDER

• PUSH BUTTON CONTROLS

(See next page.)

• MULTI FUNCTION DISPLAY

(See next page.)



• CHANNEL NUMBER HOLDER

Pull it out for changing channel tabs.

• UHF/VHF/CATV TUNING CONTROLS (INNER DOOR)

Used to adjust each channel position for desired channel.

• TAPE-SPEED SELECTOR (SP/LP/SLP)

Set this selector for the desired tape speed of a recording.

• SLOW TRACKING CONTROL

If the slow-motion or still picture contains bands of noise, this control may require adjustment.

• TRACKING CONTROL

Use this control during regular playback if the image is partially obscured by bands of noise.

• TIMER CONTROLS

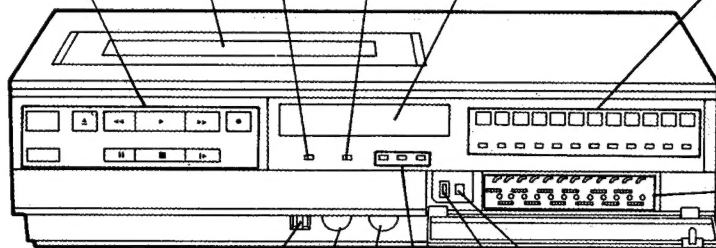
Used to set the Timer to make an Unattended Recording when you are away from home, busy or asleep.

• AUTOMATIC FINE TUNING (AFT) SWITCH (INNER DOOR)

Under normal conditions, turn the AFT Switch "ON".

• ONE TOUCH RECORD (O.T.R.) BUTTON (INNER DOOR)

One Touch Recording enables you to do impromptu recordings at any time. Just select the channel and push the ONE TOUCH RECORD Button for 30 minutes to 4 hours of recording.



PUSH BUTTON CONTROLS

• REWIND/SEARCH ◀◀ BUTTON

Push this button to rewind tapes. "REW" and "◀" appear on the Multi Function Display. During the playback mode, holding this button down will allow you to view the picture in reverse rapidly. "◀" flashes.

• EJECT BUTTON

Push this button to insert or remove the cassette. "■" flashes on the Multi Function Display while the tape is being ejected.

• POWER BUTTON

This button is used to turn the VCR on and off. When this button is pushed, counter appears on the Multi Function Display.

• VCR/TV SELECTOR

VCR: To monitor video recordings or to view playback.

TV: To watch TV or to view another program while recording a different program.

When this is set to VCR, "VCR" appears on the Multi Function Display.

• PAUSE/STILL BUTTON

Push this button to temporarily stop the tape movement in either the recording or playback mode. During playback a still picture is produced when the pause is used. Push again to release pause. When this button is pushed, "PLAY" and "■" appear on the Multi Function Display.

• PLAY BUTTON

Push this button to play back recorded tapes. "PLAY" and "▶" appear on the Multi Function Display.

• FAST FORWARD/SEARCH ▶▶ BUTTON

Push this button to move the tape forward rapidly. "FF" and "▶" appear on the Multi Function Display. During the playback mode, holding this button down will allow you to view the picture in the forward direction rapidly. "▶" flashes.

• RECORD BUTTON

Recording is started by pushing this button and the PLAY Button at the same time. "REC" and "▶" appear on the Multi Function Display.

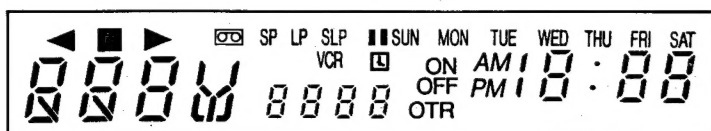
• SLOW BUTTON

While viewing a still picture, push this button to advance the picture one frame at a time. "▶" flashes. During the playback mode, pushing this button will allow you to view a slow-motion picture. "SLOW" appears on the Multi Function Display.

• STOP BUTTON

Push this button to stop the tape. "■" appears on the Multi Function Display.

MULTI FUNCTION DISPLAY



• DIGITAL CLOCK

Normally, the present time is displayed.

• TAPE COUNTER

Tape counter number is displayed.

• SPEED INDICATOR "SP" "LP" "SLP"

This shows the tape speed during recording and playback.

• VCR/TV INDICATOR "VCR"

This indicator appears when the VCR/TV Selector is set to VCR.

• FUNCTION INDICATOR "◀▶"

This shows the mode of VCR (EJECT, PLAY, REC, REW, FF, PAUSE, STILL, SEARCH, STOP, FRAME ADVANCE, SLOW).

• DEW INDICATOR "DEW"

This indicator appears if excessive moisture condenses in the unit. If the DEW Indicator is ON, the unit will not operate. If this happens, leave the VCR ON and let it remain at room temperature until this indicator goes off.

• TIMER INDICATOR "□"

When TIMER Button is set to ON, this indicator appears and you will not be able to operate the unit manually.

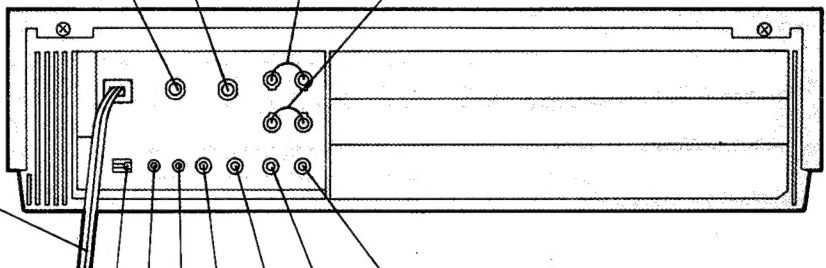
• O.T.R. INDICATOR "OTR"

When OTR is set, this indicator appears.

• CASSETTE-IN INDICATOR "◻"

This indicator shows the condition of the cassette tape in the unit.

REAR

- **VHF ANTENNA OUTPUT TERMINAL (TO TV SET)**
Connect this terminal to the VHF antenna terminal on the TV.
 - **VHF ANTENNA INPUT TERMINAL (FROM ANTENNA)**
Connect the VHF antenna to this terminal.
 - **UHF ANTENNA OUTPUT TERMINALS (TO TV SET)**
Connect these terminals to the UHF antenna terminals on the TV.
 - **UHF ANTENNA INPUT TERMINALS (FROM ANTENNA)**
Connect the UHF antenna to these terminals.
 - **AC POWER CORD**
Connect to a 120 V 60 Hz AC outlet.
 - **AUDIO INPUT CONNECTOR**
For connection to a portable video camera or another VCR.
 - **VIDEO INPUT CONNECTOR**
For connection to another VCR or a portable video camera.
 - **AUDIO OUTPUT CONNECTOR**
For connection to a monitor TV, another VCR or an audio tape recorder.
 - **VIDEO OUTPUT CONNECTOR**
For connection to a monitor TV or another VCR.
 - **CAMERA REMOTE JACK**
For connection to the Remote Pause Jack of the optional camera.
 - **REMOTE JACK**
For connection to the Wired Remote Control.
 - **RF CONVERTER CHANNEL SELECTOR**
Set to channel 3 or 4, whichever is not used in your area.
- 
- The diagram shows the rear panel of a television set. It features a variety of connectors and terminals. On the left side, there is a power cord inlet and several antenna terminals. On the right side, there are audio and video input/output connectors, a camera remote jack, a remote jack, and an RF converter channel selector. Lines connect each label to its corresponding terminal on the panel.

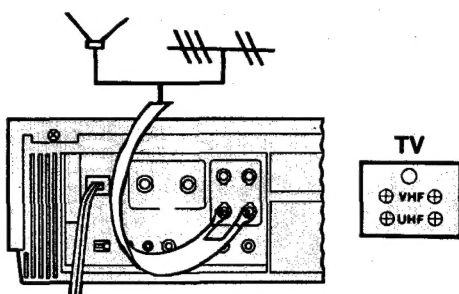
In some cases, the product may differ slightly from illustrations or photographs.
Please be assured that this difference is not due to mistake but to ongoing product improvement.

UHF AND CABLE CONNECTIONS

If you receive UHF TV broadcasts, connect TV antennas to the VCR and TV as shown below.

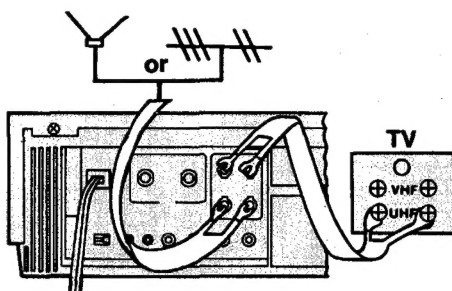
UHF CONNECTION

① Indoor or outdoor UHF antenna



- Remove the UHF antenna twin lead wires from the back of your TV, and attach these wires to the UHF IN terminals of the VCR.

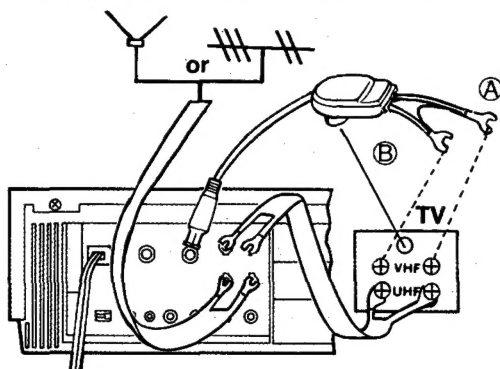
②



- Attach the Twin Lead (flat) Cable (supplied) to the UHF OUT terminals of the VCR.
- Attach the other end to the UHF terminals of the TV.

If you receive only UHF Channels, you must also add one of the following two connections ③ or ④ between your VCR and TV. This connection is necessary to view tapes in playback and to use your TV as a monitor.

- If you have only screw type VHF terminals on your TV, use connection ③. If using connection ③, set the switch of the VHF Connecting Cable to lower (300 Ω) position.
- If you have a VHF terminal on your TV, use connection ④. If using connection ④, set the switch of the VHF Connecting Cable to upper (75 Ω) position.

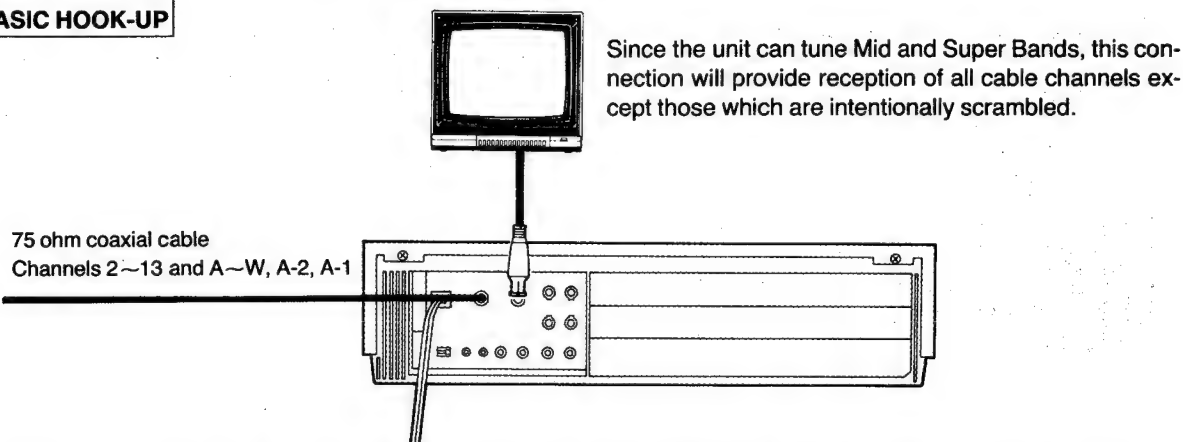


- Attach the VHF Connecting Cable (supplied) to the VHF OUT terminal of the VCR.
- Attach the other end of the cable to the VHF terminal of the TV (connection ④) or the VHF antenna terminals of the TV (connection ③).

CABLE-VCR-TV (FOR CATV/PAY CHANNELS RECORDING/PLAYBACK)

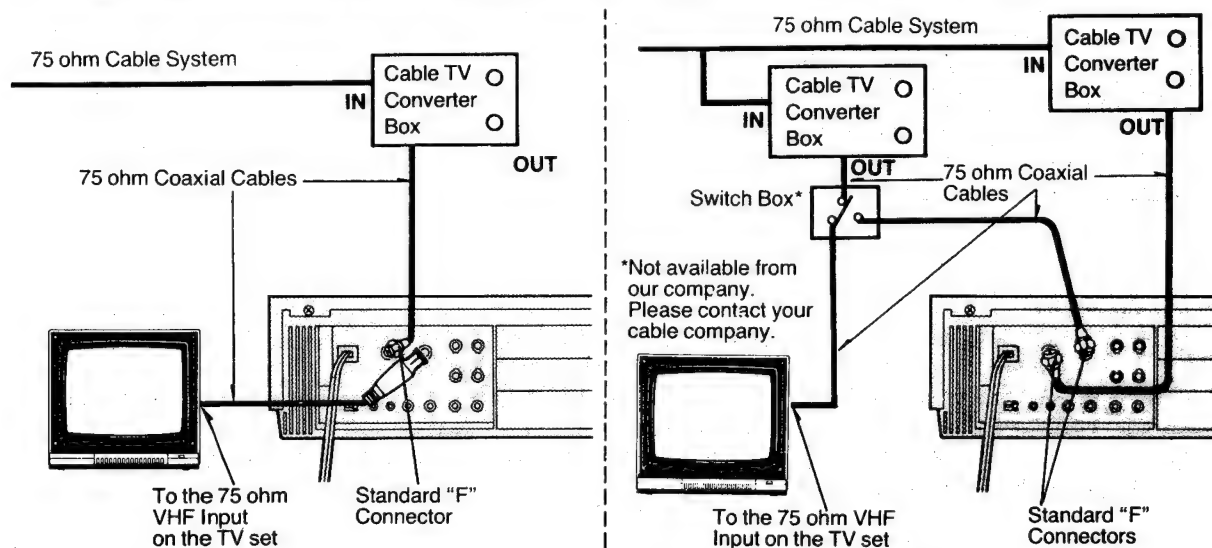
The unit has an extended range, and can tune the Mid-Band and Super-Band cable channels. (Channels A~W, A-2, A-1). Also, the unit can tune to any of the 70 UHF channels (14-83). Refer to VCR FINE TUNING.

BASIC HOOK-UP



However, if you subscribe to a special channel which is scrambled-you probably have a descrambler box for proper reception. The Unit by itself cannot properly receive a scrambled program since it does not contain a descrambler. In order for the Unit to properly receive a scrambled program, your existing descrambler must be used. There are two commonly used methods of connection in this case.

TYPICAL CABLE SYSTEM HOOK-UPS WITH CABLE CONVERTER/DESCRAMBLER BOXES



The above cable hook-up allows VCR-TV functions except for viewing one channel while recording another.

The above cable hook-up allows VCR-TV functions, including viewing one channel while recording another, but it requires two cable TV Converter Boxes and one Switch Box.

Since the PV-1230 has an extended range of tuning, tuning-programming of non-scrambled Mid-Band and Super-Band TV programs is possible. When a cable converter or descrambler box is connected to the unit, all Unattended Recording functions will continue to operate with the exception of changing channels automatically. Channel selection will have to be performed with the cable converter. Unattended Recording is therefore limited to one channel at any given time.

GLOSSARY OF TERMS

ACC

Automatic Color Control used to maintain an overall constant color signal level in the color circuits.

ACK

Automatic Color Killer.

Adjacent Track

This is the name of the video track to the immediate left or right of the track of concern.

AFC

Automatic Frequency Control used to phase-lock the color circuits to either the recording or playback color signal, in order to achieve a stable color signal.

AFT

Automatic Fine Tuning... This is a special circuit found in most recent TV sets which makes the local oscillator of the TV tuner follow the channel of concern in order to produce a stable IF frequency. In other words, if for any reason the TV station being received changes frequency, the AFT circuit will automatically compensate so that no interference will be seen on the screen, i.e., no manual fine tuning is necessary.

AGC

Automatic Gain Control used to maintain an overall constant picture level in the luminance circuits.

APC

Automatic Phase Control used to help phase lock the color circuits to either the recording or playback color signal in order to achieve a stable color signal.

Azimuth

A term used to describe the left to right tilt of the gap of a recording head, if it could be viewed straight on.

Balanced Modulator

A circuit so designed to give as an output the frequency sum or frequency difference of its two input signals. Any special characteristics of one of the input signals will be present in the output signal.

Beats

A term used to describe the unwanted signals produced when two original signals are allowed to be mixed together.

Bipolar PG

Pulse Generator signals that have both positive and negative excursions.

Burst

A short time occurrence (8 to 10 cycles) of the 3.58MHz subcarrier signal, appearing right after horizontal sync but centered on the blanking portion of the video waveform. Burst is used to keep the color oscillator of a TV receiver locked to the broadcast station.

B/W

Abbreviation for Black and White.

C

Capacitor.

C Signal

The color portion of a video signal.

Capstan

A small rotating metal dowel which drives the recording tape to assure positive tape movement.

Chroma

The color portion of a video signal.

Chrominance

The color portion of a video signal.

Clamp

The process of giving an AC signal a specific DC level.

Control Signal

A special signal recorded onto the video tape which is used during playback as a reference for the servo circuits.

Converted Subcarrier

This is the process of frequency shifting the color 3.58MHz subcarrier and its sidebands down to 629kHz.

Crosstalk

The name given to the unwanted signals obtained when a video head picks up information from an adjacent track.

CUE

To scan the playback picture at a faster than normal speed in the Forward direction.

D

Diode.

DL

Delay Line.

Dark Clip

After emphasis, the negative going spikes (undershoot) of a video signal may be too large in amplitude for safe FM modulation. A dark clip circuit is used to cut off these spikes at an adjustable level.

DDC

Direct Drive Cylinder... as used in VHS, this means that the video heads are driven by a self-contained brushless DC motor using no belts or gears. DD cylinders produce pictures with better stability.

Delta Factor (Δf)

A term used to indicate that a playback signal off the video tape has some jitter or "wow and flutter". Δf , or "a change in frequency" means that the color signal off the tape is not a stable frequency of 629kHz, but rather a signal whose frequency at any instant is some small amount above or below 629kHz.

Deviation

A term used to describe how far the FM carrier swings when it is modulated. In VHS the upper limit is 4.4MHz.

Dew Detector

A variable resistor whose resistance value depends upon the ambient humidity.

Dihedral

A term used to describe the relative position between the two video heads as they are mounted in the head cylinder. Perfect dihedral means that the tips of the heads are exactly 180° apart.

Dropout

A momentary absence of FM or color signal off the tape, whether due to uneven oxide or a coating of dust on the tape or video heads.

Duty Cycle

In describing a rectangular waveform, the "duty" refers to the percentage of off time and on time for one complete cycle. 50—50 means that there are equal periods of off time and on time for one cycle and this would be a square wave.

E-E

Electronics to Electronics...this is the picture viewed on the TV set when a recording is being made. This picture goes through some but not all of the circuits of the recorder and is used to test the operation of said circuits.

EQ

Shortened form of "Equalization", used in the audio circuits.

Emphasis

The process of boosting the level of the high frequency portions of the video signal.

FG

Frequency Generator used in the servo circuits.

FL

Filter.

FM Signal

The luminance portion of the video signal is used to control the frequency of astable multivibrator. The output of this multivibrator is a frequency modulated (FM) signal shifting from 3.4MHz to 4.4MHz (plus sidebands).

Field

One half of a television picture. A field consists of 262.5 horizontal scanning lines across the picture tube. Two fields are necessary to complete a fully scanned TV picture (frame). First, one field is "sprayed" on the picture tube, starting at the top of the tube with Line 1, and ending at the bottom with Line 262.5. Then, the next field begins at the top of the tube again with Line 262.5 and ends at the bottom with Line 525. The lines of the second field lie in-between the lines of the first field. This property of falling in-between lines is called "interlacing". The two sweeps of the picture tube, or two fields make up one complete TV picture of "frame". Frame repetition is 30Hz, therefore field repetition is 60Hz.

Flagwaving

This is the term used to describe a TV set's ability to accept unstable playback pictures from a video tape recorder. All home VTR's have some degree of playback instability. A TV set with a long horizontal AFC time constant may not recover from the VTR's instability before the active picture is being scanned. This can cause a bending or flapping from side to side of the top inch or so of the screen. This movement is called "flagwaving".

Frame

One complete TV picture. See "Field".

Gate

A circuit which will deliver an output only when a specific combination of its inputs are present. For use in analog or digital applications.

Guard Band

This is the space between video tracks on the video tape in the SP mode. Guard bands contain no information.

Hall Effect IC

An external magnetic field causes current to flow in this type of device.

HD

Horizontal Drive signal.

Head Cylinder

A cylindrical piece of metal which houses the video heads. The tips of the heads protrude slightly from the surface of the cylinder so that they may scan the tape as the cylinder spins.

Head Switching

The action of turning off during playback, the video head which is not in contact with the video tape. A particular video head will be turned off 30 times per second. This is done so that the head which is not scanning the tape, and therefore not delivering a good signal, cannot contribute any noise to the playback signal.

Head Switching Pulse

The signal which is applied to the Head Amplifier to perform head switching. This is a square wave at 30Hz, with a 50—50 duty cycle.

Helical

A word used to describe a general type of VTR in which the tape wraps around the video head cylinder in the shape of a 3-dimensional spiral, or "helix". The video tracks are recorded as a series of slanted lines.

IC

Integrated Circuit.

Interchangeability

A term used to describe how well a particular VTR will play back a tape recorded on another VTR of the same type. Good interchangeability indicates good playback.

Interlacing

The property of the scan lines of two television fields to lie in-between each other. See "Field".

Interleaving

A term used to indicate that the harmonics of the chrominance signal lie in-between the harmonics of the luminance portion of the video signal as it is viewed on a spectrum analyzer. This means that the color information of a video signal does not interfere with, although it is broadcast at the same time as, the luminance information.

Also, signals which have this interleaving property are not readily seen on a TV screen, because of their virtual cancellation characteristics.

Interleaving signals (fi) must have the following frequency relationship:

$$f_i = \left(\frac{2n+1}{2} \right) \times f_H \quad (n = 0, 1, 2, 3, 4, \dots)$$

$$f_H = 15,734 \text{ Hz (H sync frequency)}$$

Jitter

The name of the effect on the playback picture if a VTR has too much "wow and flutter". The picture appears to have a rapid shaking movement.

L

Coil.

Luminance

This is the portion of video signal which contains the sync and B/W information.

MMV

Monostable Multi-Vibrator...Usually an IC device which gives a logic high or low output with a variable duration upon receipt of an input pulse or transition.

Non-Linear Emphasis

This is similar to regular emphasis with the difference that small level high frequency portions of the signal are given more of a boost than higher level high frequency portions.

NTSC

The National Television Systems Committee. These four letters identify the United States color television standard.

O.T.R.

One Touch Recording (O.T.R.) enables you to do impromptu timer recordings at any time. When you have to go out for urgent matters or you are going to sleep, this function is very useful. Just select the channel and push the O.T.R. Button for 30 minutes to 2 hours of recordings. After recording, the VCR will be turned off automatically.

PG

Pulse Generator used in the servo circuits.

Q

A term used to describe the graphic response of a filter or tuned amplifier.

R

Resistor.

Review

To scan the playback picture at a faster than normal speed in the Reverse direction.

RF

Radio Frequencies.

Rotary Chroma

The name of the process used in VHS to change the phase of the chrominance signal at a rate of 15,734 (same as H sync frequency) times per second.

Rotary Transformer

A device used to magnetically couple RF signals to and from the spinning video heads, thus eliminating the need for brushes.

Sample and Hold

A process used in comparator circuits by which the value of a particular signal is measured at a specific moment in time...then this value is stored for later use.

Search

To scan the playback picture at a faster than normal speed in either the forward or reverse direction.

Servo

Short for Servo mechanism. This is an electro-mechanical device whose mechanical operation (for instance motor speed) constantly being measured and regulated so that it closely matches or follows an external reference.

Skew

Another way of saying Tension Error. Skew is actually the change of size or shape of the video tracks on the tape from the time of recording to the time of playback. This can occur as a result of poor tension regulation by the VTR, or by ambient conditions which affect the tape.

Subcarrier

The name of the 3.58MHz continuous wave signal used to carry color information.

SS

Slow and Still.

T

Transformer.

TP

Test Point.

TR

Transistor.

Tension Error

See "Skew".

Time Base Stability

A term used to describe how closely the playback video signal from a VTR matches an external reference video signal...in regard to sync timing rather than picture content.

Tracking

This is the action of the spinning video heads during playback when they accurately track across the video RF information laid down during recording. Good tracking indicates that the heads are positioning themselves correctly, and are picking up a strong RF signal. Poor tracking indicates that the heads are off track, and picking up low level RF signal or noise.

VCO

Voltage Controlled Oscillator...An oscillator whose frequency of oscillation is governed by an external voltage.

Video Head

This is the electro-magnet used to develop magnetic flux which will put RF information on the tape. In VHS, two video heads are mounted in a rotating cylinder around which the video tape is wrapped. As the cylinder spins, each video head is allowed to alternately scan the tape.

Video Track

The name of the RF information laid down during recording, as a particular video head scans across the tape.

VHS

Video Home System.

VTR

Video Tape Recorder.

VV

Video to Video...or...the actual playback picture produced from a tape during playback.

VXO

Voltage Controlled Crystal Oscillator...Similar to VCO except that a quartz crystal is used as a reference which can be varied.

White Clip

After emphasis, the positive going spikes (overshoot) of the video signal may be too large for safe FM modulation. A white clip circuit is used to cut off these spikes at an adjustable level.

XTAL

Abbreviation for crystal.

Y Signal

The B/W portion of a video signal containing B/W information and sync.

Service Manual

Video Cassette Recorder

Panasonic
 Omnivision **VHS**
PV-1230**PV-1222****PV-1225**
Vol. 2
**Mechanical Adjustment
Procedures**
**Electrical Adjustment
Procedures**
SPECIFICATIONS

Power Source: 120V AC $\pm 10\%$, 60Hz $\pm 0.5\%$
 Power Consumption: Approx. 18 watts
 Television System: EIA Standard (525 lines, 60 fields)
 NTSC color signal

Video Recording
 System: 2 rotary heads, helical scanning system
 Luminance: FM azimuth recording
 Color signal: Converted subcarrier phase shift recording

Audio Track: 1 track
 Tape Format: Tape width 1/2" (12.7mm), high density tape
 Tape Speed: SP mode: 1-5/16 i.p.s. (33.35mm/s)
 LP mode: 21/32 i.p.s. (16.67mm/s)
 SLP mode: 7/16 i.p.s. (11.12mm/s)

Record/Playback Time: 8 HRS. with 160 min. type tape used in SLP mode
 FF/REW Time: Less than 6 min. with 120 min. type tape
 Heads: Video: 2 rotary heads
 Audio/Control: 1 stationary head
 Erase: 1 full track erase
 1 audio track erase

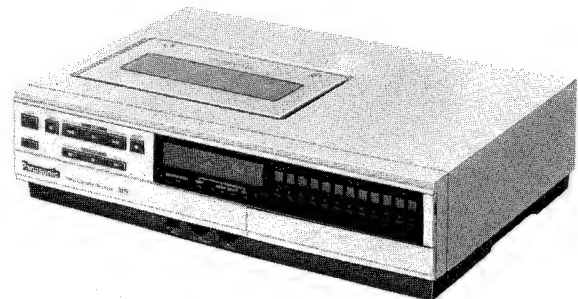
Input Level: Video: VIDEO IN Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO IN Jack (RCA type)
 -20dB, 50k Ω unbalanced

TV Tuners: VHF Input: VHF Ch2-Ch13,
 75 Ω unbalanced
 UHF Input: Ch14-Ch83,
 300 Ω balanced

Output Level: Video: VIDEO OUT Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO OUT Jack (RCA type)
 -6dB, 600 Ω unbalanced

RF Modulated: Ch3/Ch4 switchable,
 72dB μ , (Open Voltage)
 75 Ω unbalanced

Video Horizontal
 Resolution: Color: more than 230 lines
 B/W: more than 230 lines


Audio Frequency

 Response: SP mode: 100Hz ~ 8kHz
 (10dB down) LP mode: 100Hz ~ 6kHz
 SLP mode: 150Hz ~ 5kHz

 Signal-to-Noise Ratio: Video: SP mode: better than 41dB
 LP mode: better than 41dB
 SLP mode: better than 41dB
 (Rohde & Schwarz noise meter)
 Audio: SP mode: better than 42dB
 LP mode: better than 40dB
 SLP mode: better than 40dB

Operation

Temperature: 41°F—104°F (5°C—40°C)

Operating Humidity: 10%—75%

Weight: 13.0 lbs. (5.9kg)

Dimensions: 16-15/16"(W) \times 11-5/8"(D) \times 4-1/4"(H)
 (430mm \times 295mm \times 108mm)
 Accessories Supplied:

- Remote control unit
- VHF connecting cable
- 300 Ω —75 Ω transformer
- Twin-lead cable

 Available Tapes:

- 1/2" VHS video cassette tapes
- NV-T160 Approx. 1073ft. (327m), 160, 320, or 480 min
- NV-T120 Approx. 810ft. (247m), 120, 240, or 360 min
- NV-T60 Approx. 417ft. (127m), 60, 120, or 180 min.

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

Panasonic

 Matsushita Engineering & Service Company
 Division of Matsushita Electric
 Corporation of America
 50 Meadowland Parkway, Secaucus,
 New Jersey 07094

 Panasonic Hawaii Inc.
 91-238 Kauhi St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

 Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

 Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Infanteria, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

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IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $1\text{M}\Omega$ and $5.2\text{M}\Omega$.

When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. DO not use an isolation transformer for this check.
2. Connect a $1.5\text{k}\Omega$, 10 watts resistor, in parallel with a 0.15 u-F capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 equivalent) may be used to make the hot checks, leakage current must not exceed $1/2$ milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

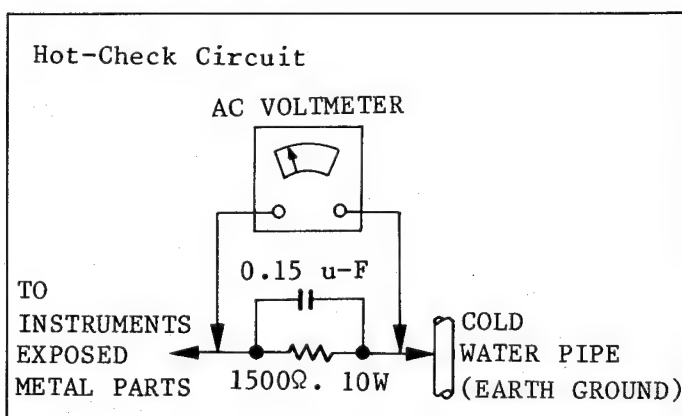


Figure 1

MECHANICAL ADJUSTMENT PROCEDURES

DISASSEMBLY OF CABINET PARTS

1. DISASSEMBLY FLOWCHART

This flowchart indicates disassembly steps of the cabinet parts and the Bottom P.C. Boards in order to find the item(s) necessary for servicing. When reassembling, perform the step(s) in the reverse order. Bottom Plate can be removed separately.

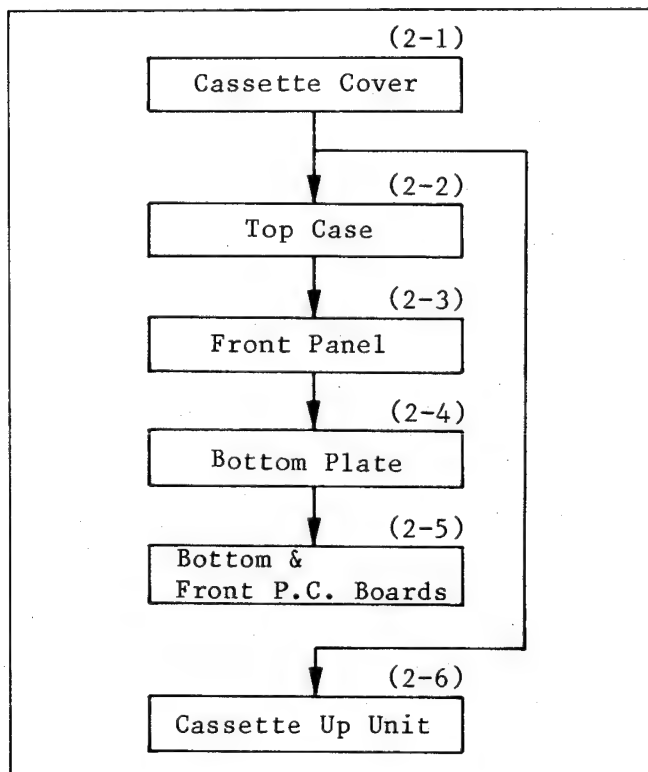


Fig. M1 Disassembly Flow Chart

Note:

1. When removing the front panel, work with care so as not to break the locking portions of the panel.
2. The 2 screws indicated by arrow marks on the bottom plate should be removed to remove the top case.

2. DETAILED DISASSEMBLY METHOD

2-1. Removal of the Cassette Cover

Press the eject button to raise the cassette up unit, remove 2 screws (A) and tilt the cassette cover upward to unlock the locking tabs. Then remove the cassette cover.

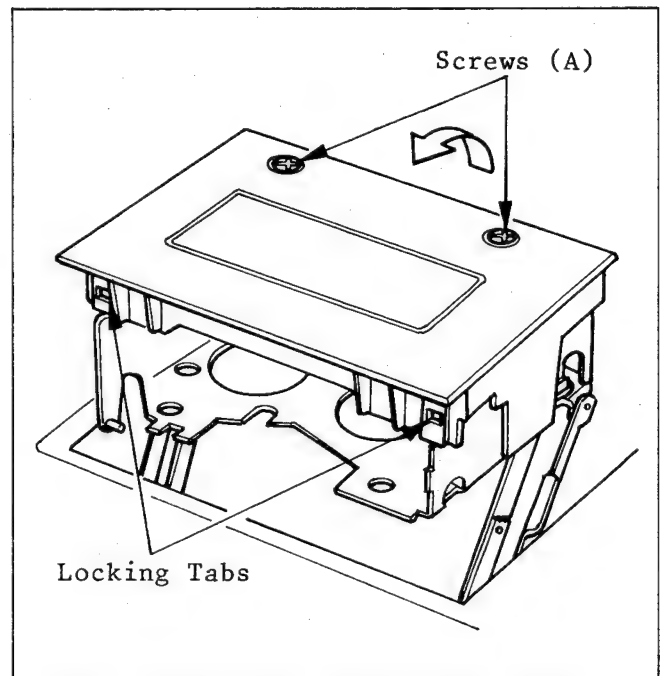


Fig. M2 Removal of Cassette Cover

2-2. Removal of the Top Case

Place the deck so that the left side faces down, hold the deck with your hand and remove 2 screws (B).

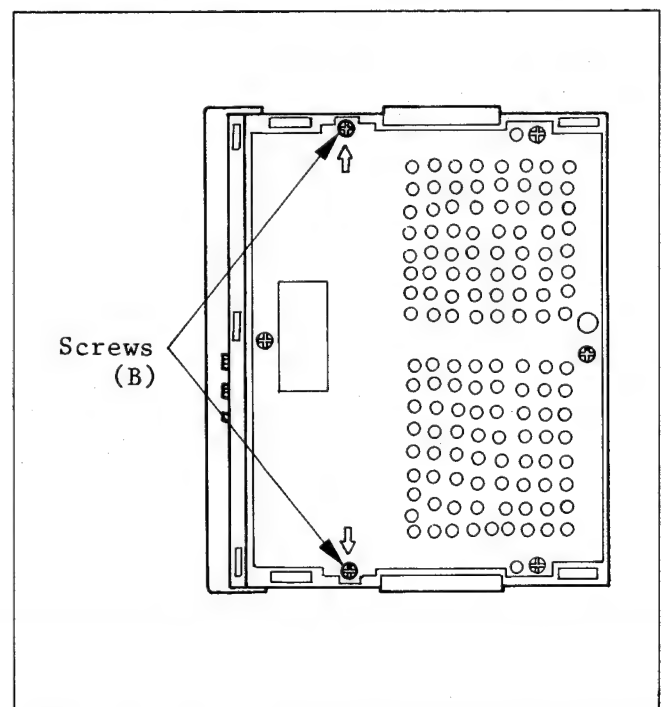


Fig. M3 Removal of Top Case-(1)

Lower the cassette up unit, remove 2 screws (C). Then pull the top case toward the back and then carefully lift the front portion to remove.

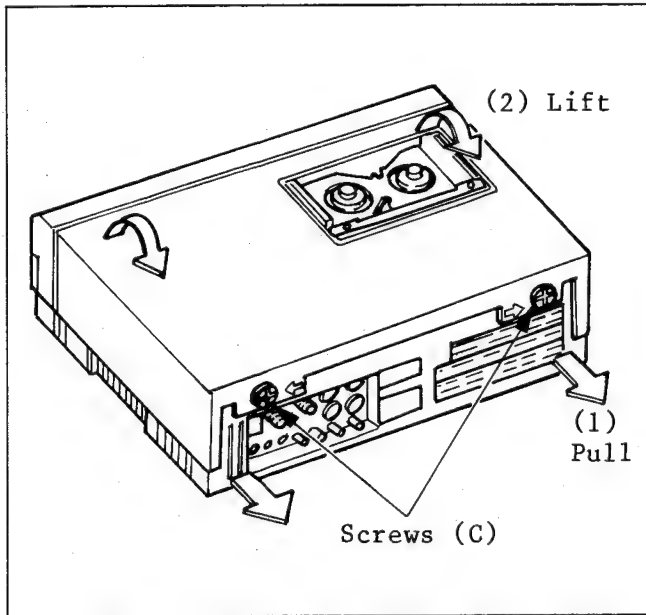


Fig. M4 Removal of Top Case -(2)

2-3. Removal of the Front Panel

Release 4 locking tabs. Then hold both right and left top portions of the panel and turn it towards the front of deck to remove.

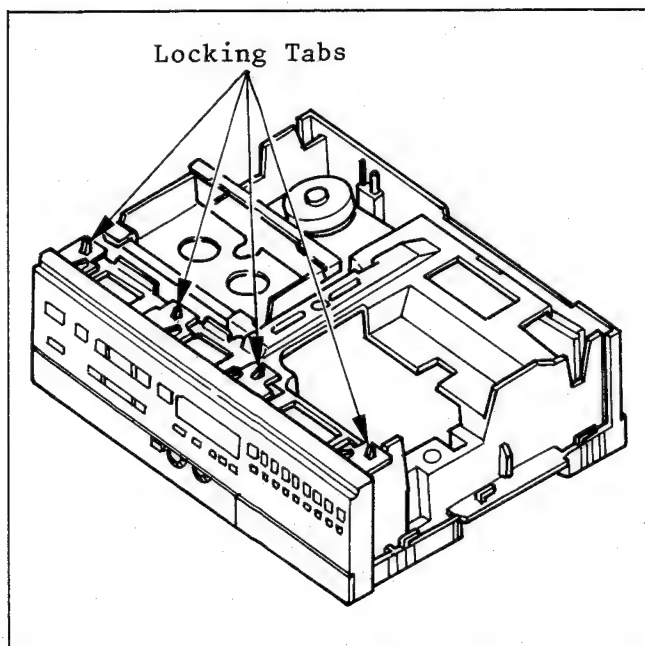


Fig. M5 Removal of Front Panel

2-4. Removal of the Bottom Plate

Place the deck so that the left side faces down, hold the deck with your hand and remove 4 screws (D).

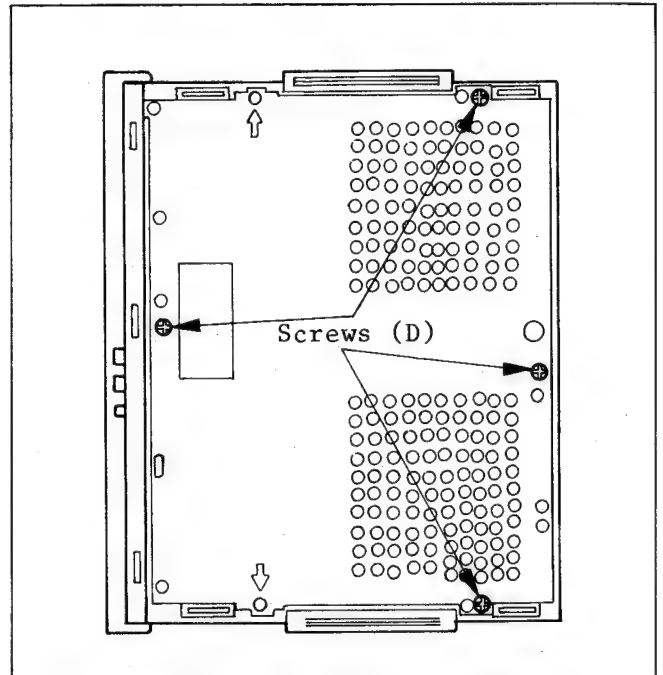


Fig. M6 Removal of Bottom Plate

2-5. Opening of the Bottom & Front P.C. Boards

Place the deck so that the left side faces down, hold the deck with your hand and remove 3 red screws (E).

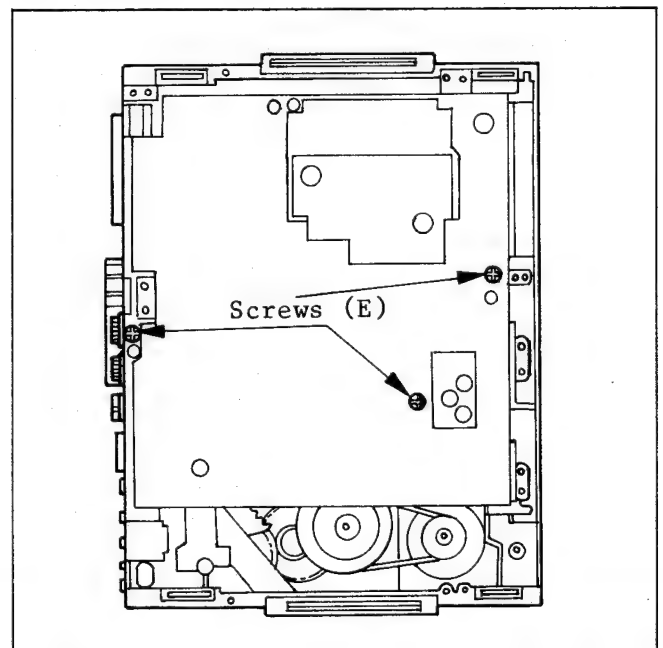


Fig. M7 Opening of Bottom & Front P.C. Boards-(1)

Next release the 6 locking tabs of front P.C. Boards.

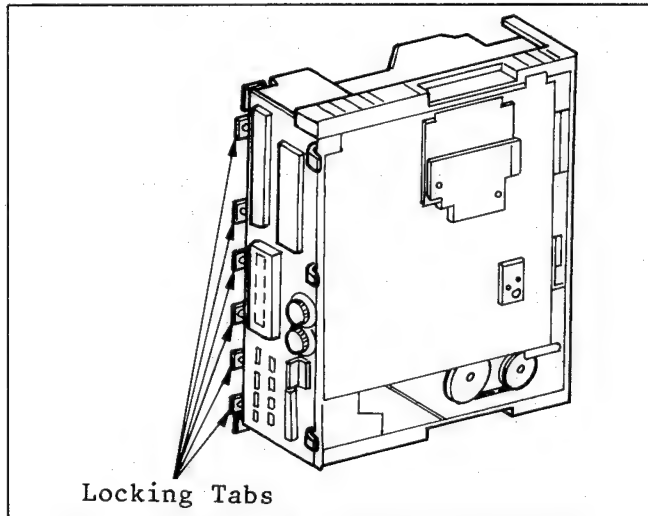


Fig. M8 Opening of Bottom & Front P.C. Boards-(2)

Then carefully open the Bottom & Front P.C. Boards.

2-6. Removal of the Cassette Up Unit

Raise the Cassette Up Unit by unlocking Lock Lever and remove 4 screws (F).

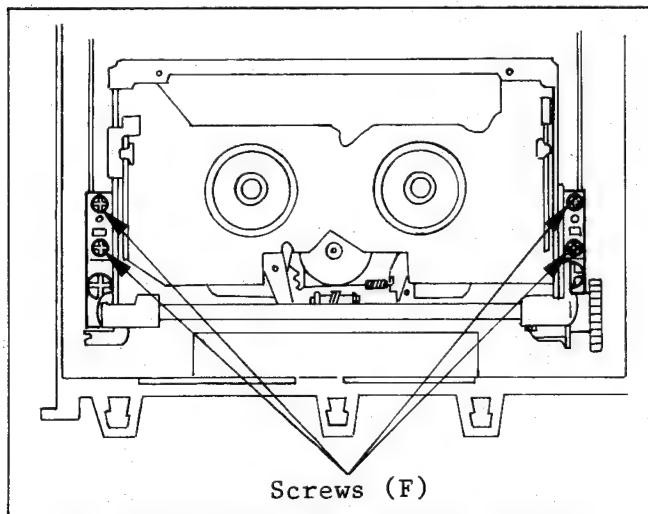


Fig. M9 Removal of Cassette Up Unit

PROCEDURE FOR CLEANING OF UPPER CYLINDER UNIT

1. Position the video head to permit access for cleaning and hold the upper cylinder to keep it from turning while cleaning.
2. Gently rub the video head in direction of tape travel with Head Cleaning Stick (VFK27) moistened with freon TF.
3. Repeat for the other video head.

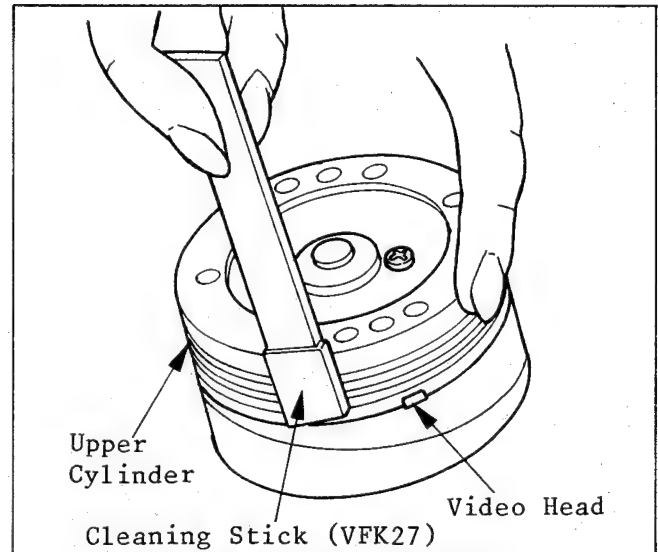


Fig. M10 Head Cleaning

Note:

1. Do not rub vertically.
2. Do not apply any pressure to head. If contaminant is not easily removed, continued gentle wiping will usually remove the substance.

ADJUSTMENT PROCEDURES

1. REPLACEMENT OF UPPER CYLINDER UNIT

Work with extreme care when removing or replacing the Upper Cylinder Unit. Do not touch video heads during servicing.

1. Unsolder the 4 wires which are color coded to matching wires on the head relay board.
2. Remove the 2 screws and gently lift the Upper Cylinder Unit from the shaft.

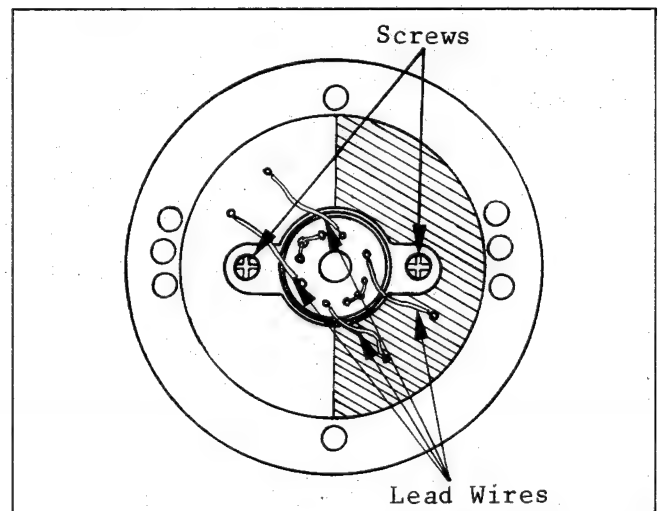


Fig. M11 Replacement of Upper Cylinder Unit-(1)

3. Before reinstalling a new unit, clean the D.D. Cylinder shaft and the surface that it engages with on the Upper Cylinder with a soft cloth dampened with Freon TF.

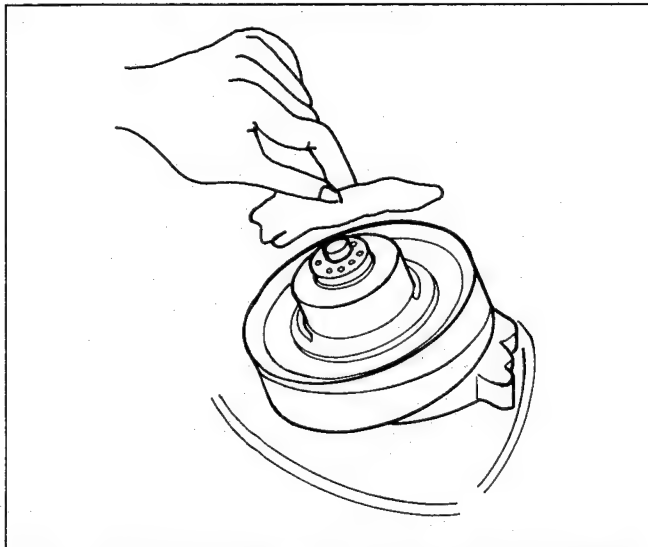


Fig. M12 Replacement of Upper Cylinder Unit-(2)

4. Install new unit according to the color code of the head relay board. Tighten the 2 screws and resolder the 4 wires to the head relay board.
5. Clean the Upper Cylinder Head with a deerskin swab saturated with Freon TF.

Note:

Upon completion of replacement, confirm performance. And if required, perform "TAPE INTERCHANGEABILITY ADJUSTMENT".

2. REPLACEMENT OF D.D. CYLINDER UNIT

Work with extreme care when removing or replacing the D.D. Cylinder Unit. Do not touch video heads during servicing.

1. Remove the 2 screws and shield case on connectors.
2. Disconnect 2 connectors (P1501 and P1502) from the D.D. Cylinder Unit.
3. Remove screw (A) and discharge angle.
4. Remove the D.D. Cylinder Unit by removing 3 screws (B).

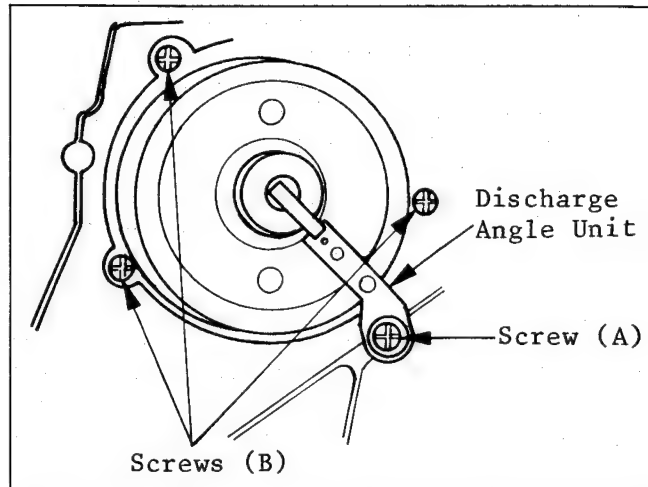


Fig. M13 Replacement of D.D. Cylinder Unit-(1)

Note:

Since there is very little clearance between D.D. Cylinder Unit and chassis, remove the D.D. Cylinder Unit gently and carefully.

5. Remove the Upper Cylinder Unit from the D.D. Cylinder and reinstall it on new one. To perform this step, refer to "REPLACEMENT OF UPPER CYLINDER UNIT" section.
6. Reinstall the new D.D. Cylinder Unit and connect P1501 and P1502. Reinstall the shield case and Discharge Angle Unit.

Note:

1. When reinstalling the New D.D. Cylinder Unit, fit the New D.D. Cylinder Unit to the chassis by turning it counterclockwise.

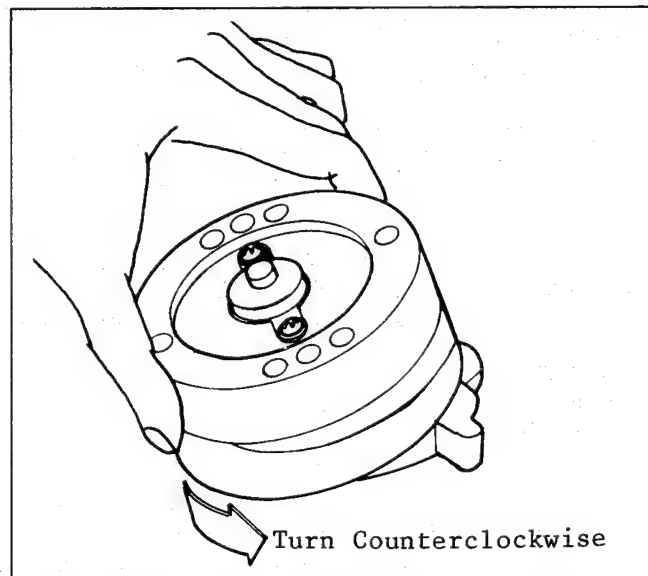


Fig. M14 Replacement of D.D. Cylinder Unit-(2)

2. Upon completion of replacement, confirm performance.
If any further maintenance is required, perform "TAPE INTERCHANGE-ABILITY ADJUSTMENT".

3. CONFIRMATION OF DISCHARGE ANGLE UNIT INSTALLATION POSITION

Check to see if the Discharge Angle Unit is correctly set in a position as close to 1 mm as possible to the UP side from the center of the cylinder shaft as show in Fig. M15.

Note:

Never install the Discharge Angle Unit to any position to the down side from the center of the cylinder shaft, but always within a maximum of 1 mm to the UP side of the center of this shaft.

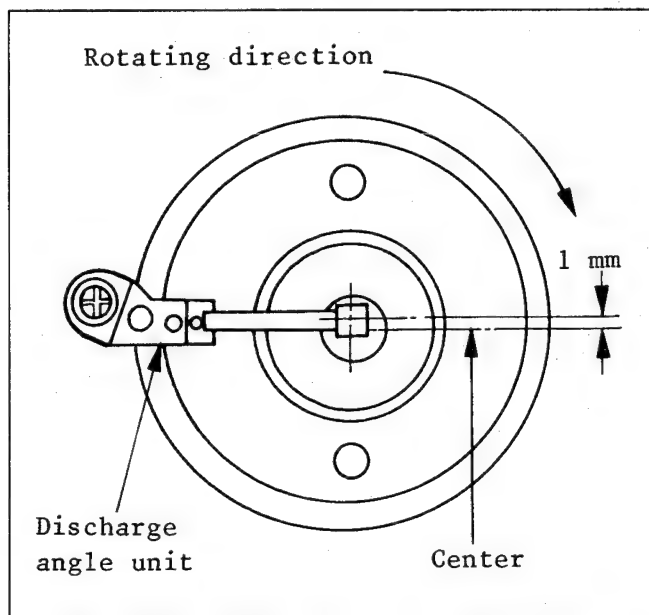


Fig. M15 Confirmation of Discharge Angle Unit Position

4. ADJUSTMENT OF V-STOPPERS

* Equipment Required:

V-Stopper Adjustment

Fixture VFKS0029

1. Remove the D.D. Cylinder Unit from chassis. (Upper Cylinder Unit does not need removal from the D.D. Cylinder Unit.) Refer to "REPLACEMENT OF D.D. CYLINDER UNIT" section.

2. Loosen 4 screws (A) and install the fixture.
Push the V-stoppers snugly against the pins and tighten the 4 screws(A).

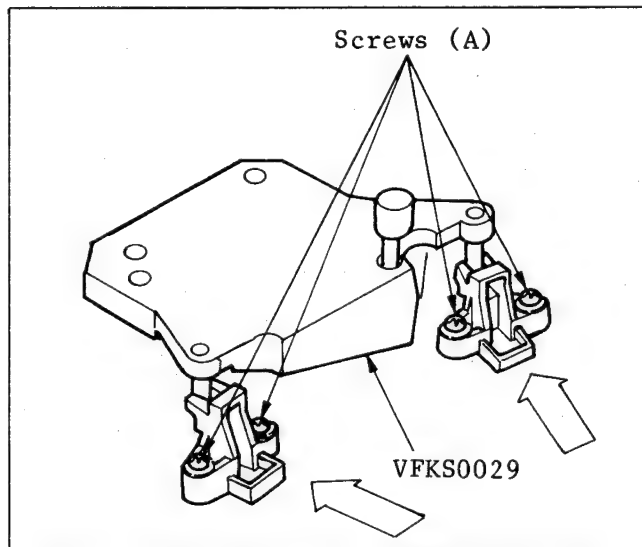


Fig. M16 Adjustment of V-Stoppers

3. Upon completion of the adjustment, simulate loading completion to ensure that posts smoothly fit the V-Stoppers. Then reinstall the D.D. Cylinder Unit.

5. POSITION ADJUSTMENT OF TENSION POST

* Equipment Required:

Tension Post Adjustment Plate

.....(VFKS0002)

Fine Adjustment Screwdriver

.....(VFKS0136)

1. Remove the Cassette Cover, Top Case, and Cassette Up Unit.
2. Push the Lock Lever down. Cover the takeup and supply photo transistor with black tape. Push the PLAY button to complete loading, then disconnect the AC plug.
3. Loosen the screw slightly so that the tension band bracket can be moved in accordance with the procedure in item 5, but does not move when the screwdriver is removed.
4. Place the adjustment plate.
5. Insert the fine adjustment screwdriver into the hole and move the tension band bracket right or left so that the tension post just touches the fixture.

6. Remove the adjustment plate and tighten the screw.
7. Replace the adjustment plate. Confirm that the tension post just touches the fixture.
8. Remove the black tapes that cover the photo transistors.

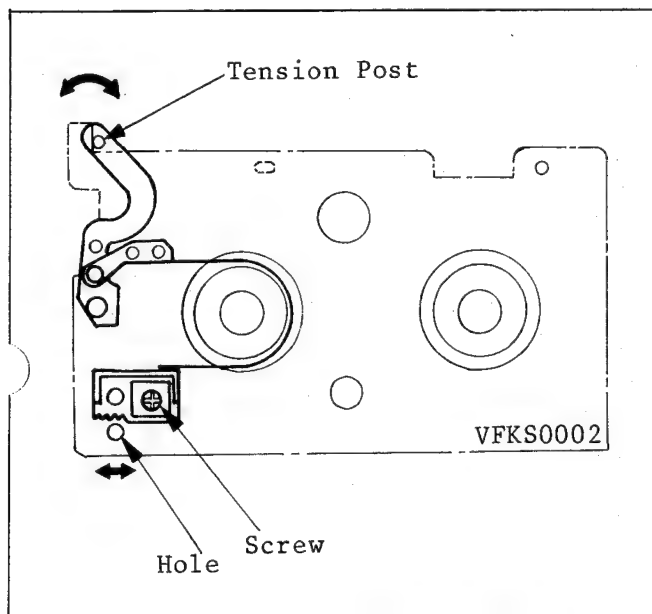


Fig. M17 Adj. of Tension Post

6. MEASUREMENT AND ADJUSTMENT OF BACK TENSION

A: Measurement Procedure

* Equipment Required:

Back Tension Meter (Tentelometer, Model T2-H7-UM, Purchase Locally)
VHS Cassette Tape (120 Minute Tape)

* Specification: 25 – 30g

1. Remove the Cassette Cover and Top Case.
2. Pull the erase head in the direction indicated by the arrow and hold it with adhesive tape.
3. Playback the cassette tape from its beginning and wait until tape running has stabilized. (for approx. 10 to 20 seconds)
4. Insert tension meter in tape path and confirm reading.
5. If the reading is out of specification, perform the adjustment procedure.

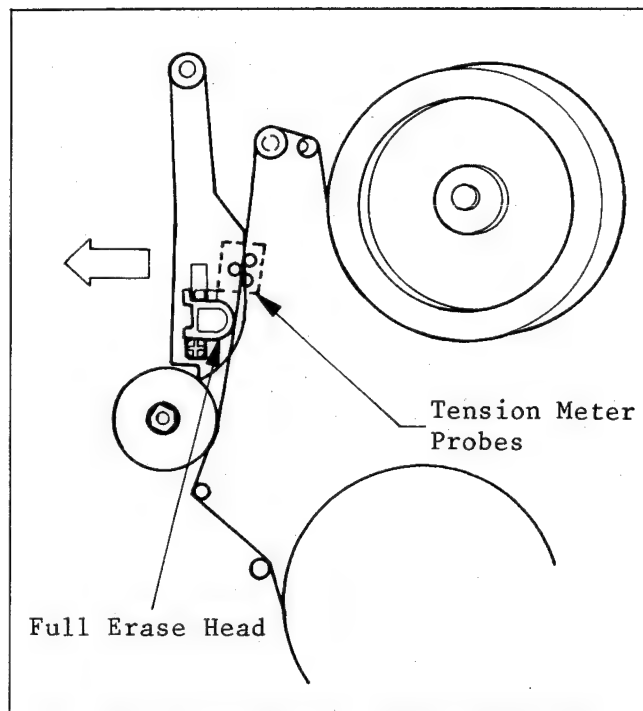


Fig. M18 Measurement of Back Tension

Note:

1. Make sure that the three probes of the meter are all in solid contact with tape, but out of contact with any other parts while measuring.
2. It is recommended that measurements be taken three times as tension meter is very sensitive.

B: Adjustment Procedure

* Equipment Required:

Fine Adjustment Screwdriver...(VFK0136)

1. Loosen screw (A) and insert the fine adjustment screwdriver into the hole (B).
2. Move the adjustment plate as indicated by the arrow to obtain the specified tension.
Turn the driver clockwise to loosen tension, counterclockwise to tighten tension.
3. Tighten screw (A) and verify tension with the meter once again.
4. Reinstall the cabinet parts.

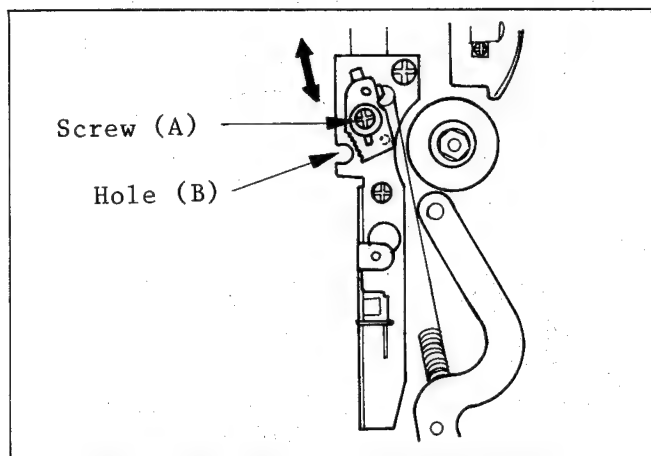


Fig. M19 Adj. of Back Tension

Note:

Upon completion of adjustment, remove the adhesive tape holding the erase head.

7. CONFIRMATION OF BRAKE TORQUE

*** Equipment Required:**

Dial Torque Gauge.....(VFK0133)
Adaptor for Gauge.....(VFK0134)

1. Remove the Cassette Cover and Top Case.
2. Attach the adaptor to the torque gauge and place the deck in STOP mode.
3. Place the torque gauge on the reel table. The weight of gauge should not rest on the reel table.

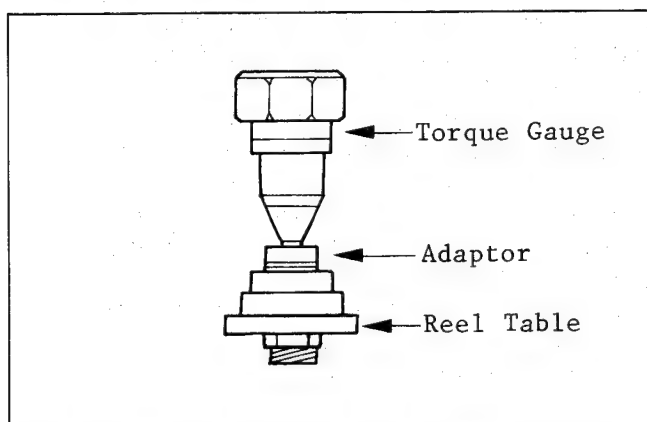


Fig. M20 Confirmation of Brake Torque-(1)

4. Turn torque gauge in either direction indicated in the Fig. M21 and read the gauge when the brake begins slipping.

Note:

If proper brake torque can not be obtained, clean the rotating surface of reel table with a soft cloth and recheck torque before replacing brakes.

	Supply Reel	Takeup Reel							
	<table border="1"> <thead> <tr> <th></th><th>A</th><th>B</th></tr> </thead> <tbody> <tr> <td>Takeup</td><td rowspan="2">more than 450g.cm</td><td rowspan="2">50 - 125g.cm</td></tr> <tr> <td>Supply</td></tr> </tbody> </table>			A	B	Takeup	more than 450g.cm	50 - 125g.cm	Supply
	A	B							
Takeup	more than 450g.cm	50 - 125g.cm							
Supply									

Fig. M21 Confirmation of Brake Torque-(2)

8. CONFIRMATION OF TAKEUP TORQUE

*** Equipment Required:**

Dial Torque Gauge (VFK0133)
Adaptor for Gauge (VFK0134)

*** Specifications:**

in PLAY mode 100 - 180g.cm
in F.F. mode more than 400g.cm
in REW mode more than 400g.cm

1. Remove the Cassette Cover, Top Case and Front Panel.
2. Attach the adaptor to the torque gauge.
3. Connect a jumper from TP6303 to TP6304, and cover the takeup and supply photo transistors with black tape.
Lower the cassette up unit and turn power switch on.
4. Place the torque gauge on the takeup reel table, push the play button and read torque on the gauge.
Repeat above procedures in F.F. mode after pushing the F.F. button.

Note:

While measuring, the weight of the gauge should not rest on the reel table.

5. Set the torque gauge on the supply reel table, press the rewind button to check REW mode torque.
6. Remove the jumper and the black tape that covered the photo transistors.

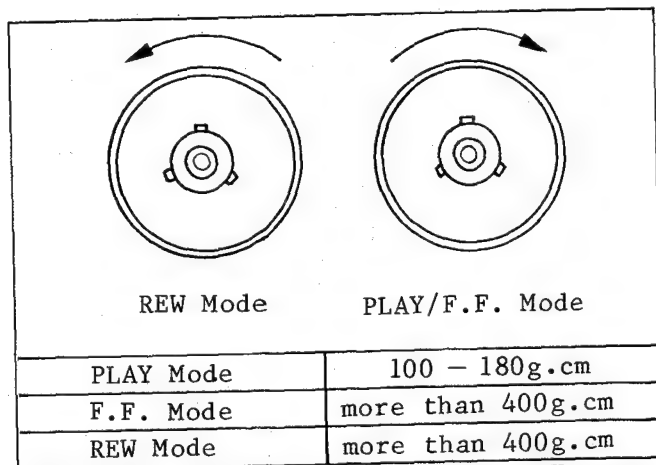


Fig. M22 Confirmation of Takeup Torque

9. POSITION ADJUSTMENT OF SAFETY TAB SWITCH

* Equipment Required:
Cassette Holder Fixture VFKS0004

1. Remove the Cassette Cover, Top Case and Cassette Up Unit.
2. Slightly loosen the screws (A) and (B).
3. Place the fixture in place over the reel tables.
4. Push Safety Tab Switch Angle with pushing down the Safety Tab Switch Lever with something like a screwdriver until Safety Tab Switch just turns ON. And tighten the screws (A) and (B).

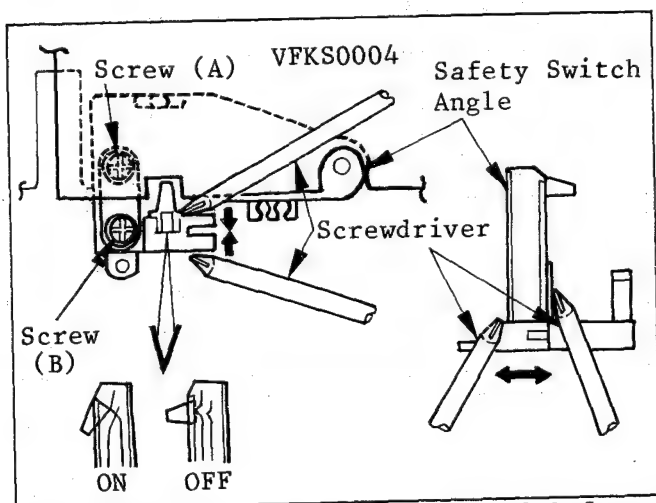


Fig. M23 Position Adjustment of Safety Tab Switch-(1)

Note:

1. Don't adjust with upward switch lever.
2. Confirm that the Safety Switch correctly turns ON and OFF using video cassettes with and without the Safety Tab.

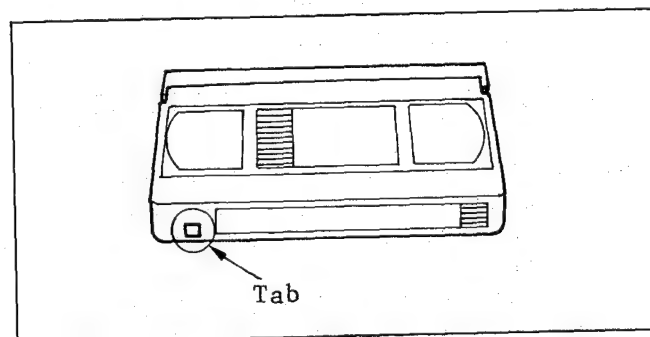


Fig. M24 Position Adjustment of Safety Tab Switch-(2)

10. HEIGHT ADJUSTMENT OF REEL TABLES

* Equipment Required:
Post Adjustment Plate (VFKS0010)
Reel Table Height Fixture .. (VFKS0009)

* Specification 0 (+- 0.1) mm

1. Remove the Cassette Up Unit.
2. Place the post adjustment plate over the reels, and put the fixture on it. Set the fixture to zero "0" making sure that the scraper of fixture touches the cut-out portion of the plate.

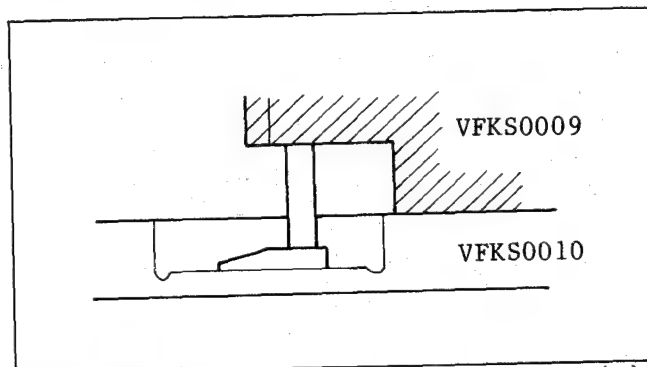


Fig. M25 Adj. of Reel Table Height-(1)

3. Then measure the top portion of reel table and confirm the difference against the result of the measurement taken in the above step. Do same for the other reel table.

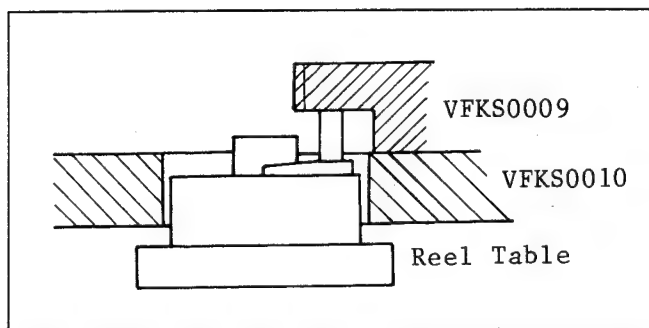


Fig. M26 Adj. of Reel Table Height-(2)

4. If the difference is more than 0.1mm (higher or lower), adjust the height of reel table to obtain the specified height.
5. For adjustment, change the poly slider washer located under the reel table. (The washer is available in sizes of varying thickness, $t=0.13\text{mm}$, 0.25mm and 0.5mm .)

11. HEIGHT ADJUSTMENT OF TAPE GUIDE POSTS

* Equipment Required:

Lock Screw Wrench(VFKS0032)
 Post Adjustment Plate(VFKS0010)
 Reel Table Height Fixture(VFKS0009)
 Nut Driver(Purchase Locally)
 Post Adjustment Screwdriver(VFK0137)

1. Remove the Cassette Cover, Top Case and Cassette Up Unit. Place the Adjustment Plate.

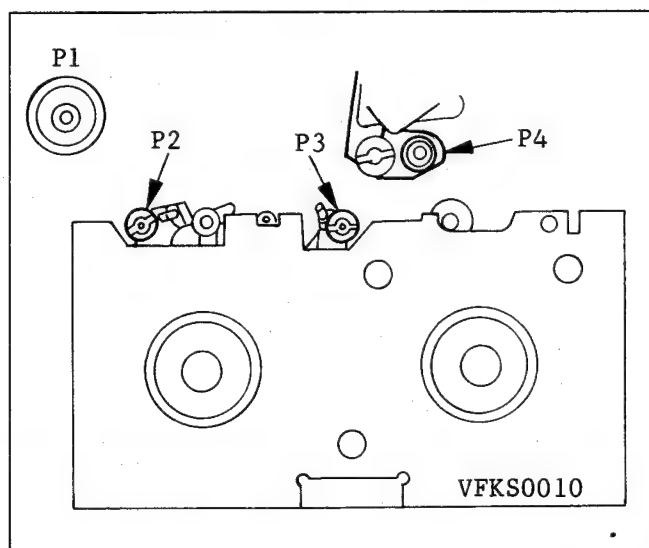


Fig. M27 Adj. of Tape Guide Post Height-(1)

2. First lower all posts so that the condition of height becomes as shown below.

(Lower end of post and tape guide should be lower than scraper. Loosen lock screw located at lower portion of posts (P2 & P3) by Lock Screw Wrench, then turn the posts with post adjustment screwdriver.)

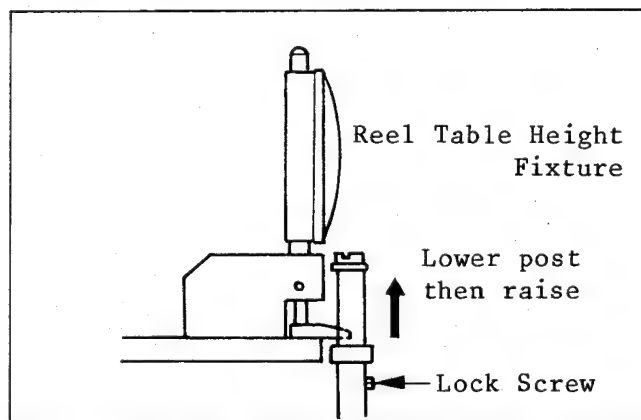


Fig. M28 Adj. of Tape Guide Post Height-(2)

3. Place the fixture on the Adjustment Plate and fit the scraper to the Adjustment Plate as shown in Fig. M28. (The scraper of the fixture should be fully lowered till it touches plate.)
4. Set the fixture to zero "0" and slowly raise the post until it just touches the scraper. When the scraper touches the post, it should fit as shown below in Fig. M29 (b). For adjustment of P1 and P4, use the nut driver. (The Post cap on P4 can be removed by turning counterclockwise.) For adjustment of P2 and P3, use the post adjustment screwdriver.

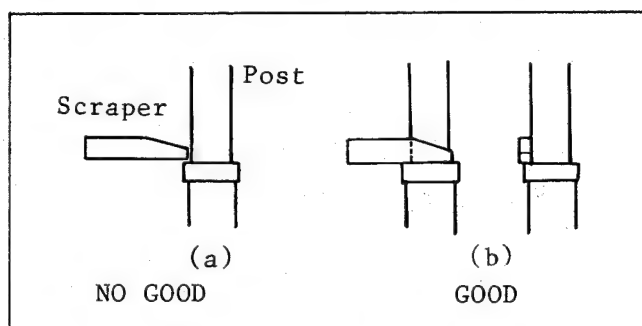


Fig. M29 Adj. of Tape Guide Post Height-(3)

Note:

Upon Completion of adjustment, tighten lock screws on the P2 and P3 by Lock Screw Wrench and also install the post cap on post 4. When the post cap on P4 is reinstalled, the position of it should be as shown below when viewed from the direction indicated by the arrow.

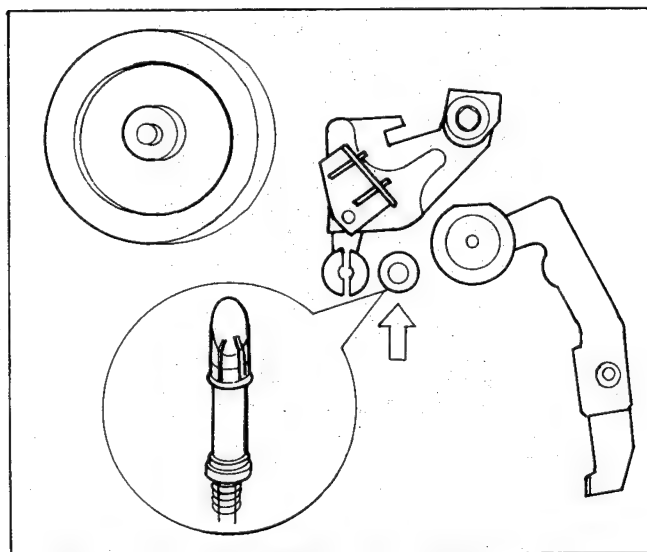


Fig. M30 Installation of Post Cap

12. TAPE INTERCHANGEABILITY ADJUSTMENT (FINAL ADJUSTMENT)

Note:

To perform these adjustment/confirmation procedures, make sure that the tracking control is set in the detent (fixed) position.

*** Equipment Required:**

Alignment Tape VFMS0001H6
Post Adjustment
Screwdriver VFK0137
H-Position Adjustment
Screwdriver VFKS0003
Lock Screw Wrench VFKS0032
Lock Wrench (1.5mm) VFK76
Nut Driver (5.5mm) ... Purchase Locally
Oscilloscope

12-A. CONFIRMATION OF TAPE TRAVEL

1. Playback a cassette tape and confirm that the tape travels without curling at the edges of the tape.

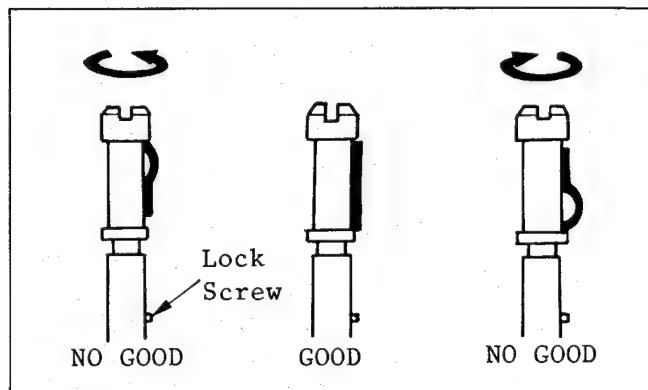


Fig. M31. Confirmation of Tape Travel

2. If curling is apparent, adjust the height of posts by turning the top of post with the post adjustment screwdriver. (for P2 & P3)

Note:

Before turning P2 and P3, slightly loosen a lock screw by the Lock Screw Wrench.

12-B. CONFIRMATION OF A/C HEAD HEIGHT

This confirmation is required when the A/C Head was replaced and for preliminary height adjustment. For final adjustments, perform item 12-C, 12-D, next page.

1. Looking at the lower edge of the control head with the tape running, ensure that the lower edge of the tape runs along the lower edge of the control head. If it doesn't, slightly turn the nut (A) in either direction to correct. Clockwise to lower the head and counterclockwise to raise it.

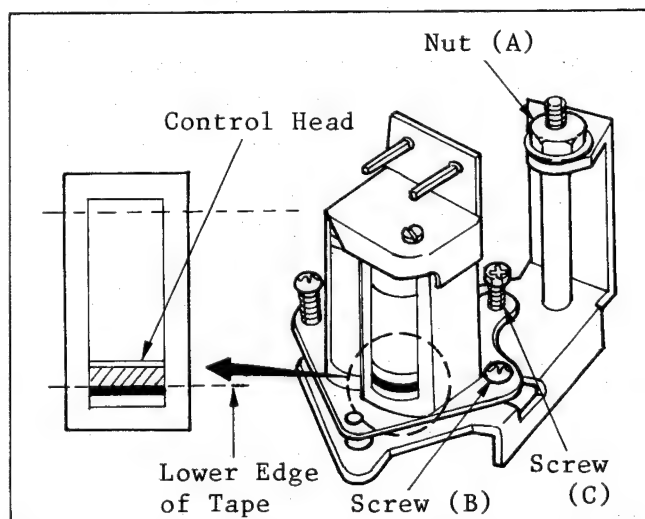


Fig. M32 Confirmation of A/C Head Height

12-C. CONFIRMATION OF TILT OF A/C HEAD

This procedure should be performed after the height adjustment of P4.

1. Playback the tape and confirm that the tape runs between lower and top limiters of P4post. Also confirm that the tape is running smoothly.
2. If adjustment is required, turn clockwise the screw (C) until curling is apparent at lower edge of P4. Then turn the screw (C) counterclockwise until the curling is smoothed out.

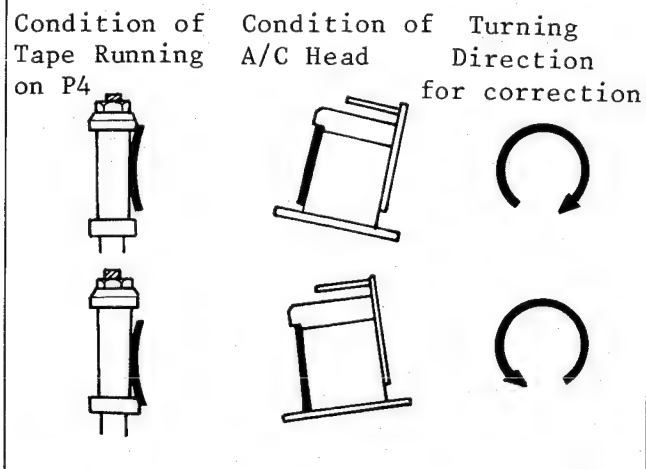


Fig. M33 Confirmation of A/C Head Tilt

12-D. HEIGHT AND AZIMUTH ADJUSTMENT OF A/C HEAD

1. Connect the oscilloscope to the audio output jack on the rear of the deck.
2. Playback the monoscope portion (6kHz, Mono) of the alignment tape, VFMS0001H6.
3. Adjust the screw (B) on the head base so the output level becomes maximum.

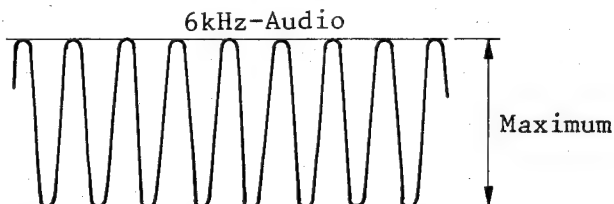


Fig. M34 Adj. of A/C Head Height

4. Readjust nut (A) for maximum output.

12-E. HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD

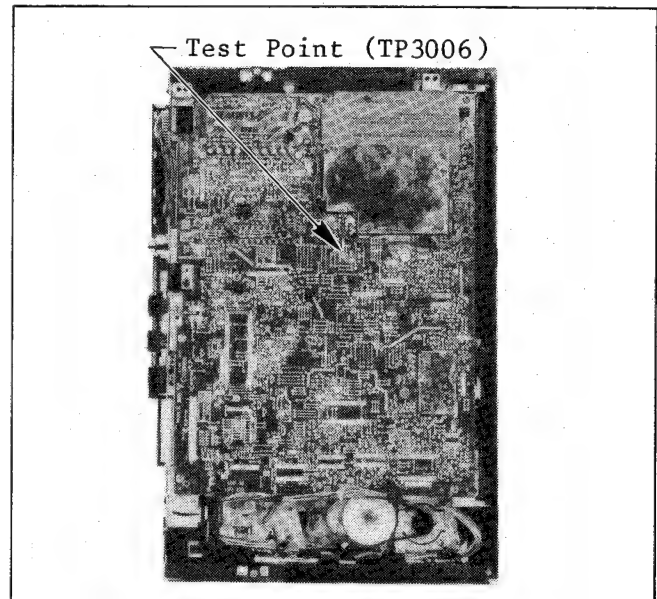


Fig. M35 Horizontal Position Adjustment of A/C Head-(1)

1. Connect the oscilloscope to the TP3006 on Luminance Signal Process Section. Use TP2003 as a trigger.
2. Playback the monoscope portion of the alignment tape, VFMS0001H6 and confirm that RF envelope appears as in Fig. M37.
3. If adjustment is required, set the H-position screwdriver into the slot of the adjustment nut and rotate in either of right or left for the maximum envelope output.

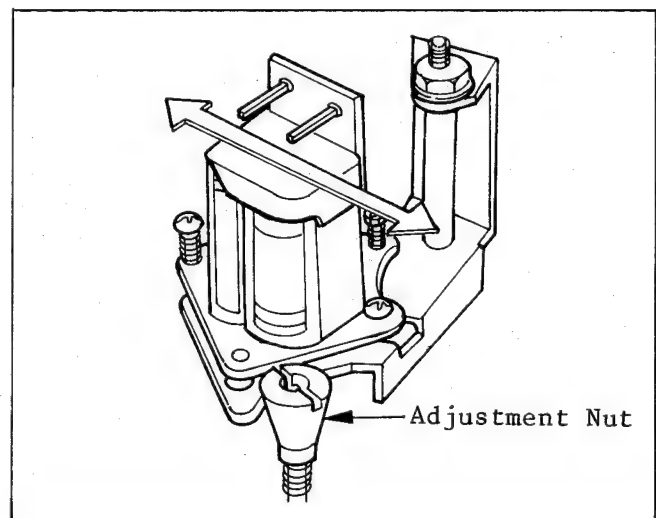


Fig. M36. Horizontal Position Adjustment of A/C Head-(2)

12-F. CONFIRMATION/ADJUSTMENT OF ENVELOPE OUTPUT

1. Set the tracking control in the detent (fixed) position. Connect the oscilloscope to the Pin 14 of Luminance C.B.A.
2. Playback the monoscope portion of the alignment tape VFMS0001H6 and adjust the height of posts P2 and P3 watching the scope display so that the envelope becomes as flat as possible.
($V1/V\text{-max} \geq 0.7$, $V2/V\text{-max} \geq 0.8$)
If adjustment is required, turn top of post with post adjustment screwdriver. For adjustment of P2 & P3, refer to step 2 of item 12-A.

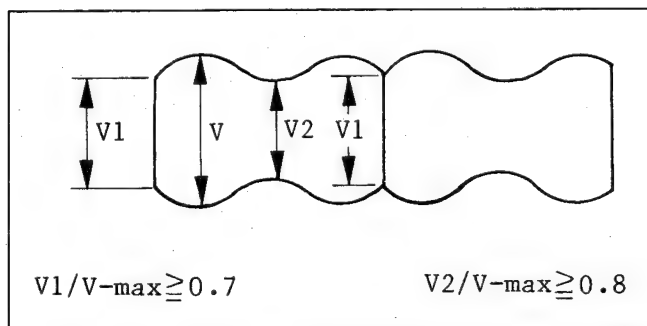


Fig. M37 Spec. of Envelope Figure-(1)

3. When the scope display is as follows, adjust the height of P2 so that the waveform looks like Fig. M40.

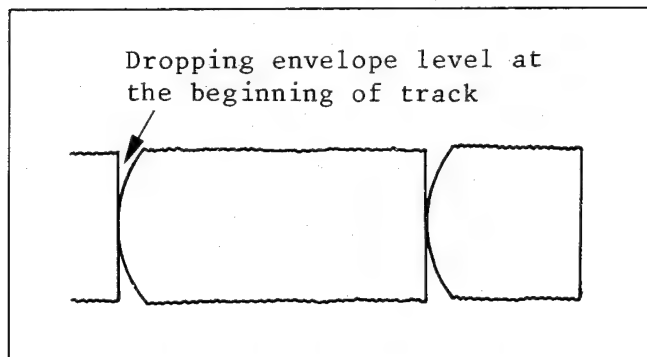


Fig. M38 Envelope Figure-(2)

4. When the scope display is as follows, adjust the height of P3 so that the waveform looks like Fig. M40.

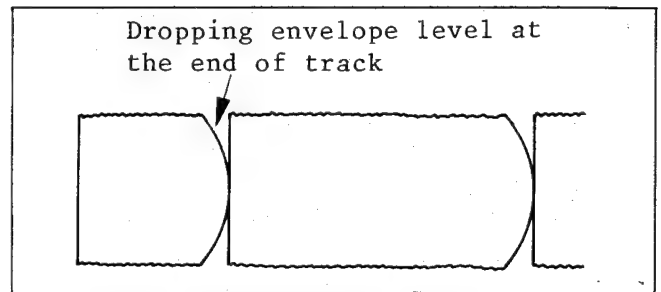


Fig. M39 Envelope Figure-(3)

5. The scope display should appear as shown below when P2 and P3 are adjusted correctly.

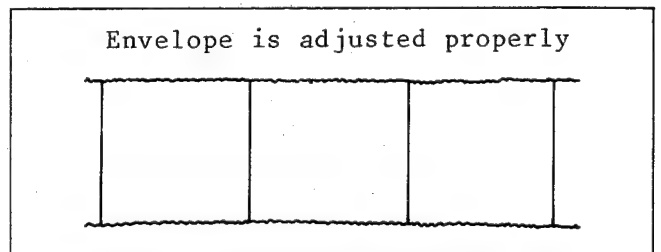


Fig. M40 Envelope Figure-(4)

6. Readjustment the Horizontal position of A/C Head.

13. ADJUSTMENT OF FG HEAD GAP

* Equipment Required:

Fine Adjustment Screwdriver ... VFK0136

* Specification: 0.16 (+/- 0.02) mm

1. Remove 2 screws (A) on the Thrust Holder, then remove the Capstan Pulley Unit, 5 screws (B) and Capstan Stator Unit.

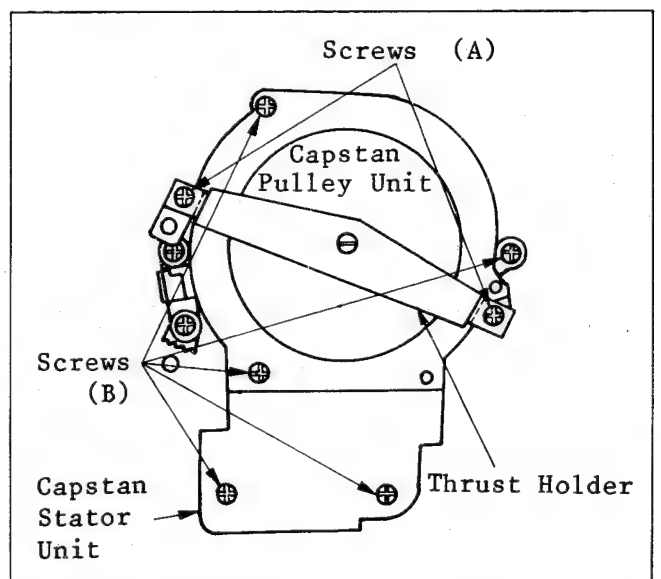


Fig. M41 Adjustment of F.G. Head Gap-(1)

2. Slightly loosen the 2 screws (C) and set the fine adjustment screwdriver into the hole (D). Turn screwdriver clockwise until the FG head touches the rotor and just slightly turn it counterclockwise so the gap becomes as specified.

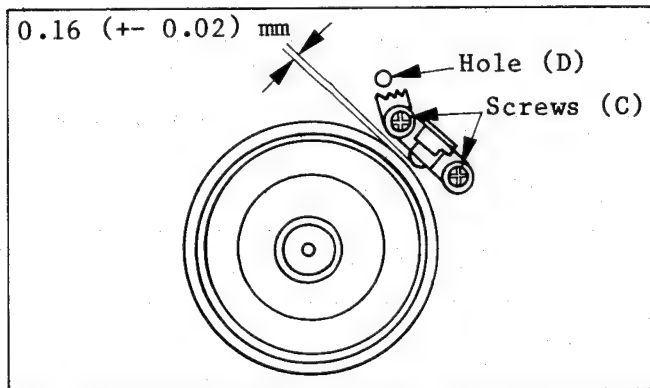


Fig. M42 Adjustment of F.G. Head Gap-(2)

Note:

1. Do not touch the outside circumference surface of the rotor with any tool, and keep any magnetizable material away from the rotor magnet.
2. When reinstalling the Capstan Stator Unit, the circumference of the hole in the Capstan Stator Unit must be centered with the circumference of the Rotor Boss.

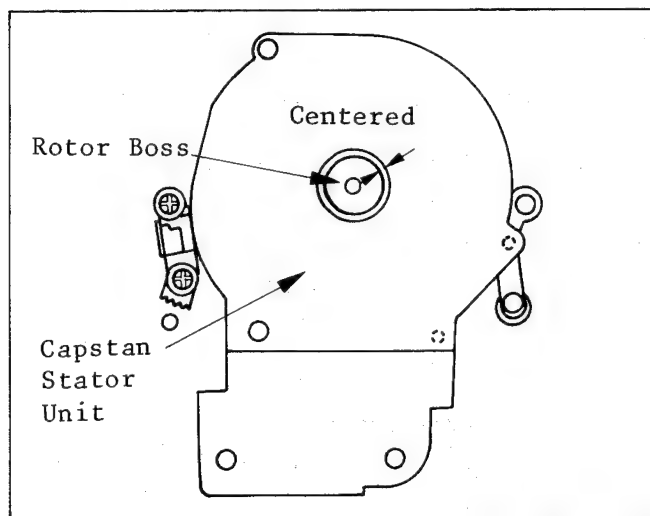


Fig. M43 Adjustment of F.G. Head Gap-(3)

14. CONFIRMATION/ADJUSTMENT OF THRUST GAP

- * Equipment Required:
Reel Table Height Fixture VFKS0009
- * Specification: 0.05 - 0.09mm

1. Place the Unit upside down and place the height fixture on the Thrust Holder. Set the fixture to zero "0".
2. Next, push the capstan shaft by your finger, and confirm the thrust gap.
3. If the gap is out of specification, then adjust the thrust screw by turning it clockwise or counterclockwise.

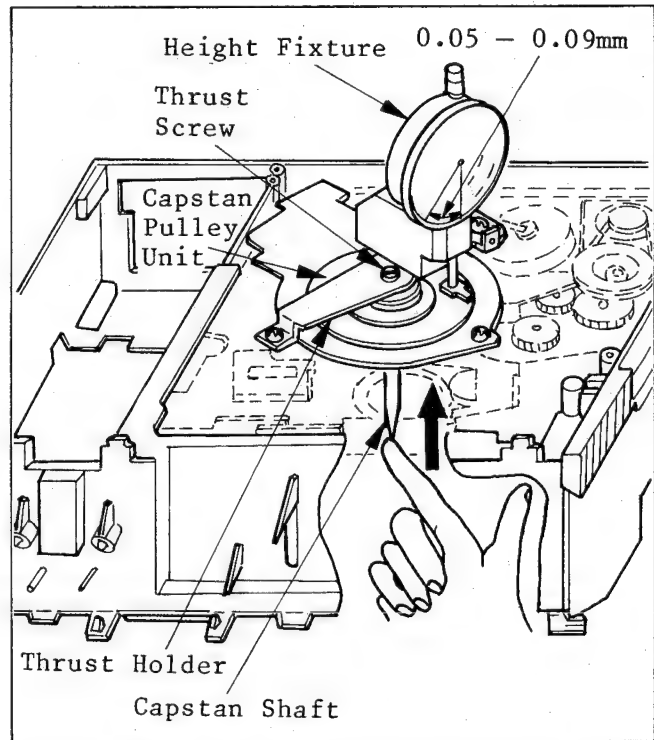


Fig. M44 Confirmation/Adjustment of Thrust Gap-(1)

Note:

Upon completion of above procedure, adjust the capstan seal so that this seal is out of contact with the pressure roller and capstan holder. The specification of clearance is approx. 0.5 (+/- 0.2) mm.

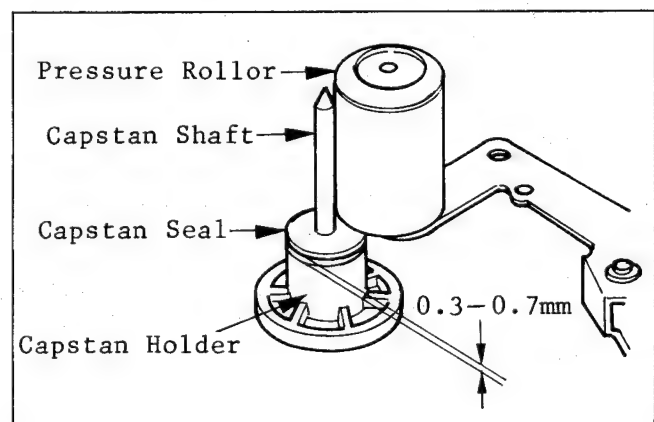


Fig. M45 Confirmation/Adjustment of Thrust Gap-(2)

15. ADJUSTMENT OF CAM GEAR AND MODE SELECT SWITCH

General Condition:

The mechanism of this model is mostly engaged to the electrical circuit, System Control Circuit, through the mode select switch. Therefore the relation between the mode switch and the cam gear determines all further mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If the adjustment of this item is performed improperly, the deck will be unloaded or automatically stopped. It will also result in damage to mechanical and electrical parts.

Note:

The Step 7 of this procedure describes the necessary adjustment if the mode select switch is replaced.

Adjustment Procedures:

This procedure strats with the condition that the Cassette Lock Unit, Kick Base Unit, Sector Gear, Cam Gear and Driving Gear have been removed.

1. Turn loading gear clockwise until post 2 and 3 are fully unloaded. The small projection on the loading gear will be pointing up in the unloaded condition.

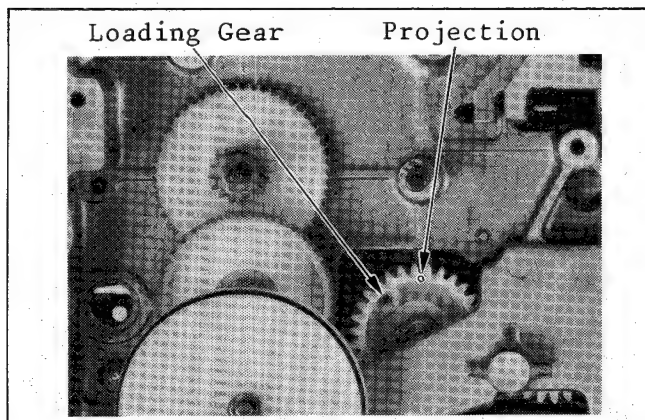


Fig. M46 Adj. Procedure-(1)

2. Install the driving gear so that the hole on the driving gear meets the projection on the loading gear. Ensure that the loading gear is still in the fully unloaded condition. Install the C-Ring to mount driving gear.

3. Slowly slide the main rod so that the hole (B) of the main rod meets the hole (C) of chassis.

This will simulate stop mode (unloading completion) of main rod and mode select switch.

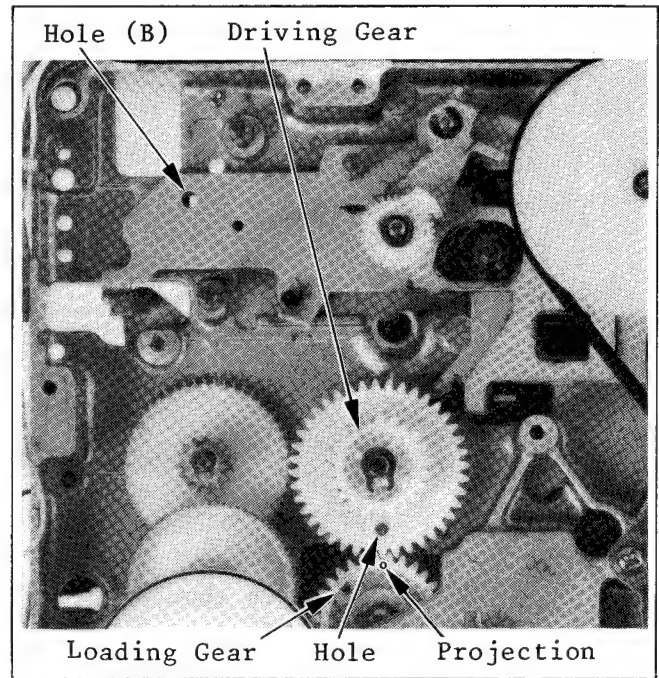


Fig. M47 Adj. Procedure-(2)

4. Insert the cam gear with the simple slot side showing so that the hole (A) on the gear meets the hole (B) on the main rod. To facilitate matching the two holes, use the small hex, wrench or a metal pin. Then install the C-Ring to mount cam gear.

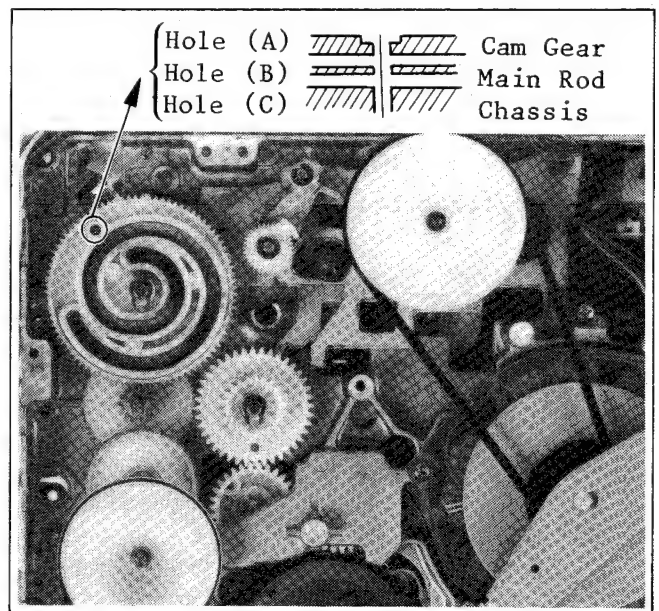


Fig. M48 Adj. Procedure-(3)

5. Install the sector gear so that the pin on the sector gear meets the inner slot of the cam gear as shown in Fig. M49. Also install C-Ring in order to mount sector gear.

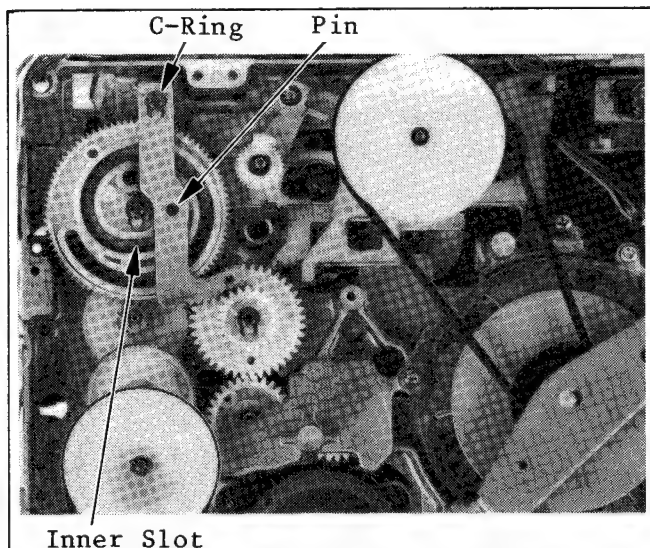


Fig. M49 Adj. Procedure-(4)

6. Completed adjustments should appear as illustrated below.

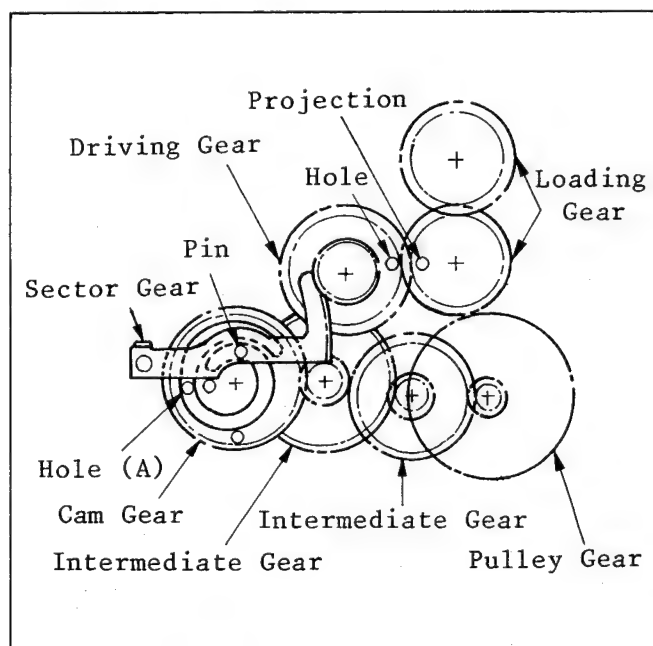


Fig. M50 Adj. Procedure-(5)

7. (Adjustment of Mode Select Switch) Keep the main rod in the unloading completion condition so that the hole (A) cam gear, hole (B) of main rod and the hole (C) of chassis are aligned. Upon completion, ensure that the movement of the deck is normal.

Place the Mode Select Switch so that the movable projection (A) on Mode Select Switch fits around the tab (B) on the main rod, enclosing it. Slowly slide the Mode Select Switch sideways until the V-notches in movable Projection and the V-notch on the Mode Select Switch are aligned. Tighten two screws (C) to secure alignment.

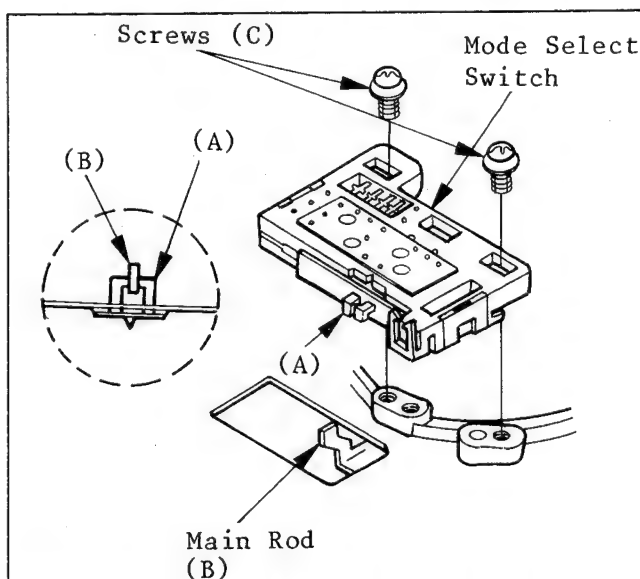


Fig. M51 Adj. of Mode Select Switch-(1)

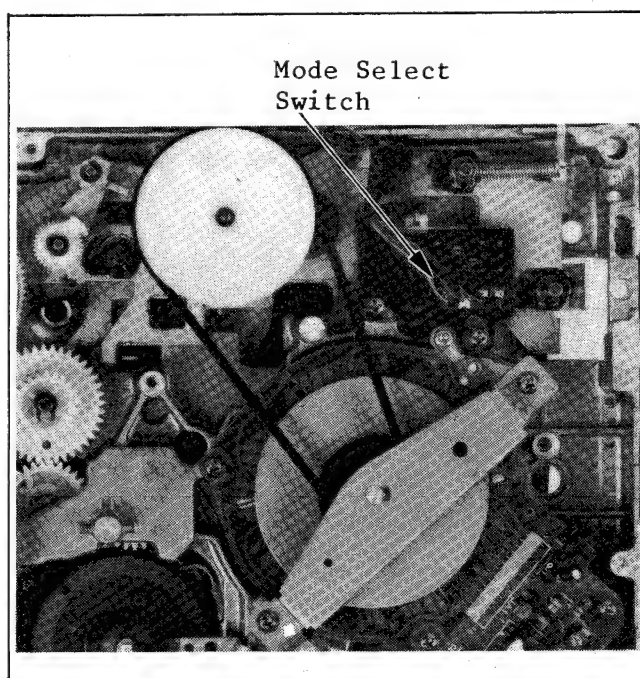
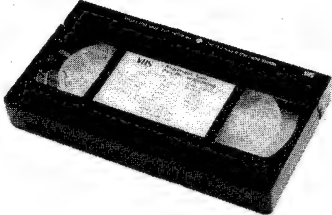
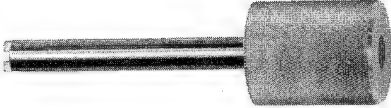
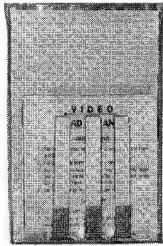
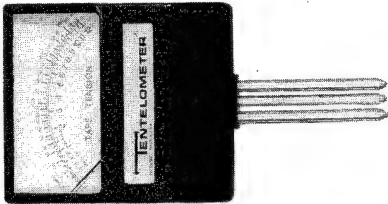
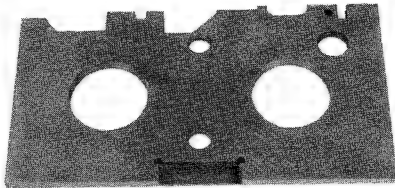
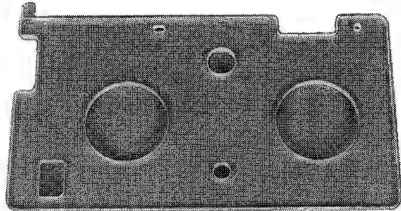
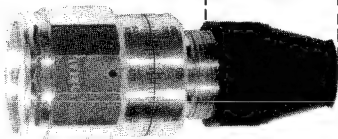
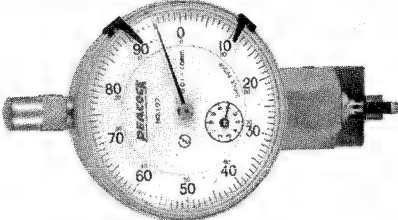

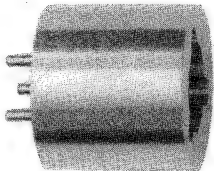



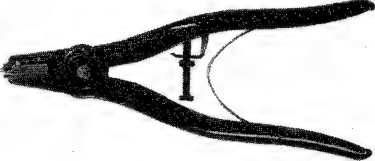
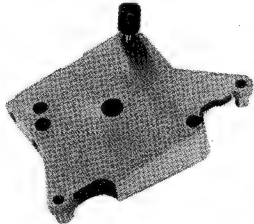


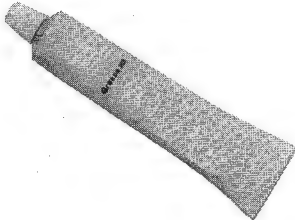


Fig. M52 Adj. of Mode Select Switch-(2)

8. Turn the Pulley gear in both directions to confirm smooth movement of this mechanism.
9. Install the Cassette Lock Unit and Kick Base Unit.

Servicing Fixtures & Tools

VFMS0001H6 VHF Alignment Tape 	VFK0137 Post Adjustment Screwdriver 	VFK27 Head Cleaning Stick 
Back Tension Meter (Tentelometer, Made in U.S.A.) 	VFKS0010 Post Adjustment Plate 	VFKS0002 Tension Post Adj. Plate 
VFK0133 Dial Torque Gauge VFK0180 (Plastic Clamper Only) 	VFKS0009 Reel Table Height Fixture 	VFKS0003 H-Position Adj. Fixture 
VFK0134 Adaptor for VFK0133 	VFKS0004 Cassette Holder Fixture 	VFKS0031 V-Hold Adj. Tool 
VFKS0032 Lock Screw Wrench 	VFK0144 Retaining Ring Remover (3mmφ) VFK0145 Retaining Ring Remover (4mmφ) 	VFKS0016 V-Stopper Adj. Fixture 
VFK0136 Fine Adjustment Screwdriver (3mmφ) 	VFK76 Hex. Wrench (1.5mm) 	MOR265 Molytone Grease 

ELECTRICAL ADJUSTMENT PROCEDURES

1. TEST EQUIPMENT

To perform the electrical adjustments completely, the following equipment is required.

1. DVM (Digital Volt Meter)
Voltage Range: 0.001 - 50V
2. Dual-trace Oscilloscope
Voltage Range: 0.005 - 50V/Div.
Frequency Range: DC - 10MHz
Prodes: 10:1, 1:1
3. Frequency Counter
Frequency Range: 0 - 150MHz
4. Signal Generator
Sinewave: 0 - 10MHz
5. AC Millivolt Meter
Voltage Range: 0 - 3mVrms.
6. Tuning Amp.
7. VIF Sweep Generator/Trap Adjuster
8. Spectrum Analyzer
9. DC Power Supply Unit
Voltage: 0 - 15V DC
10. Variable Attenuator
Attenuate: (+- 0) dB - -50dB
11. Monitor Scope
12. Color TV Receiver or Monitor
13. V-Hold ADJ. Tool
(VFKS0031)
14. Plastic Tip Driver and Non-Metal
Driver
15. Lock Screw Wrench
(VFKS0032)
16. VHS Alignment Tape
(VFMS0001H6)

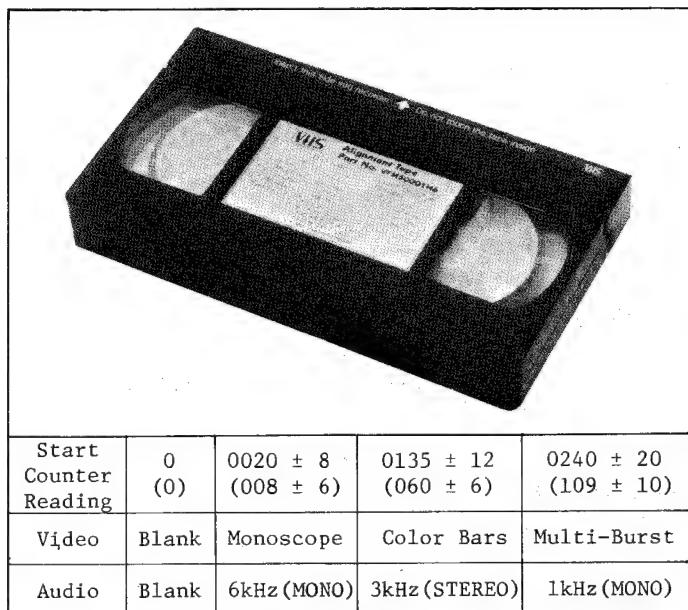


Fig. E1

2. ADJUSTMENT PROCEDURES

These adjustment procedures consist of the following sections.

1. Servo Section
2. Audio Section
3. Luminance and Chrominance Section
4. System Control Section
5. TV Demodulator Section

2-1. SERVO SECTION

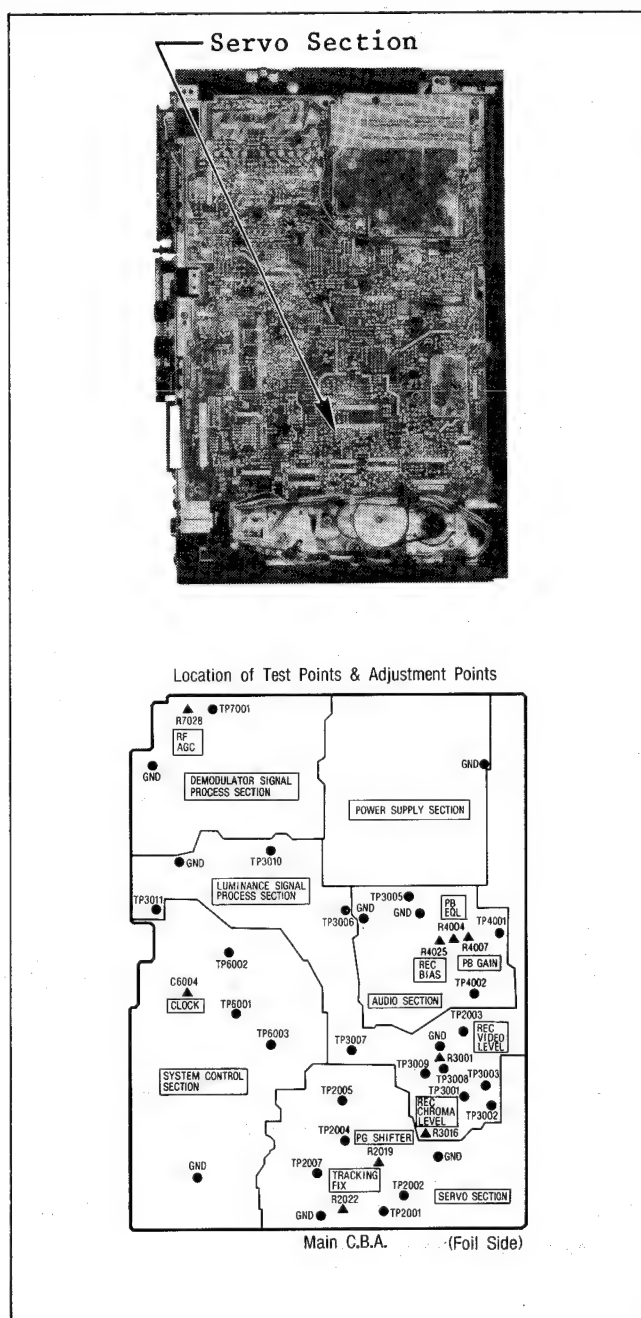


Fig. E2

2-1-1. HEAD SWITCHING POSITION ADJUSTMENT

Test Points: TP2003, TP3010

Adjustment : R2019 (PG SHIFTER)

1. Playback color bar section of the alignment tape.
2. Connect the scope CH 1 to TP3010 and CH 2 to TP2003 on the Luminance Signal Process Section. Set the scope to the CHOP mode.
3. Also set the scope to the Delay mode or expand the vertical interval of the signal from TP3010.
4. Adjust the PG SHIFTER (R2019) so that the head switching point is 6 (± 1) H before the start of vertical sync as shown below.

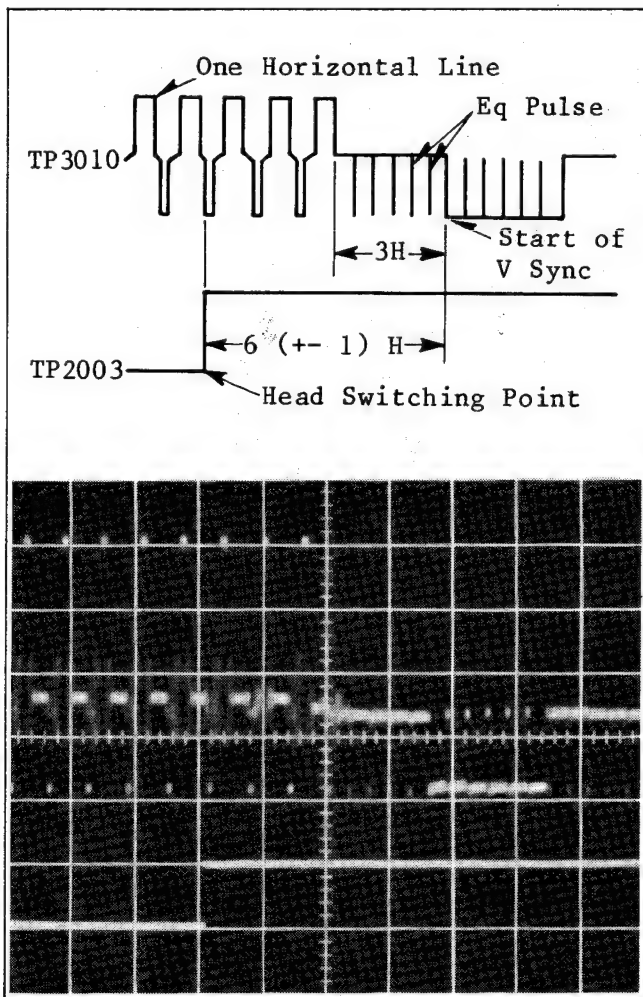


Fig. E3 TP3010 0.5V/0.1msec. div.
TP2003 5V/0.1msec. div.

5. Change the slope selector on the scope from "+" to "-" and make sure that the other switching point is also 6 (± 1) H before the beginning of vertical sync.

2-1-2. TRACKING FIX ADJUSTMENT

Test Points: TP2002, TP2003

Adjustment : R2022 (TRACKING FIX)

1. Supply a video signal to the Video Input on the rear panel or tune in a local TV program.
2. Set the Tracking Control on the front panel to the center detent point.
3. Insert a cassette tape and make a recording in the SP mode for a few minutes.
4. Playback the portion just recorded.
5. Connect the scope CH1 to TP2003 on the Luminance Signal Process Section and CH2 to TP2002 on the Servo Section.
6. Adjust the TRACKING FIX (R2022) so that the T is 0.4 (± 0.4) msec.

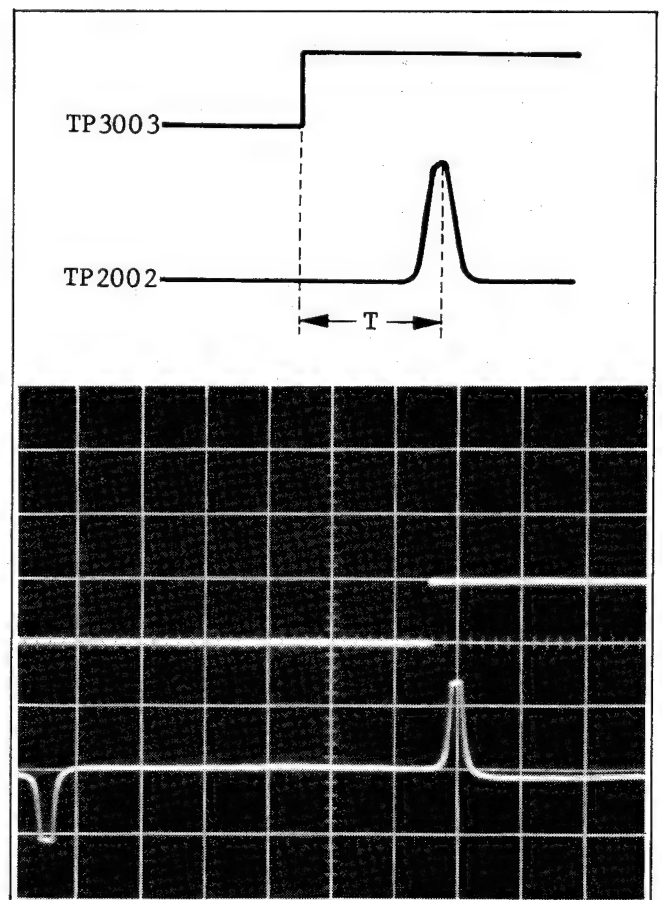
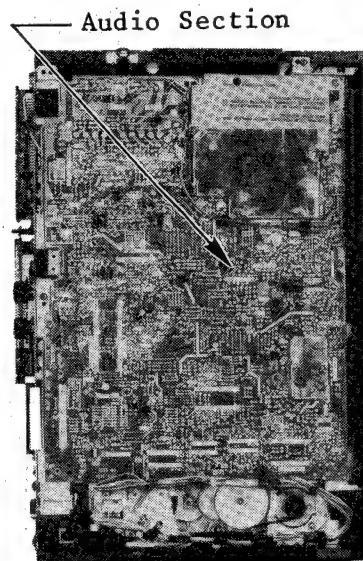


Fig. E4 TP2003 1V/2msec. div.
TP2002 5V/2msec. div.

2-2. AUDIO SECTION



Location of Test Points & Adjustment Points

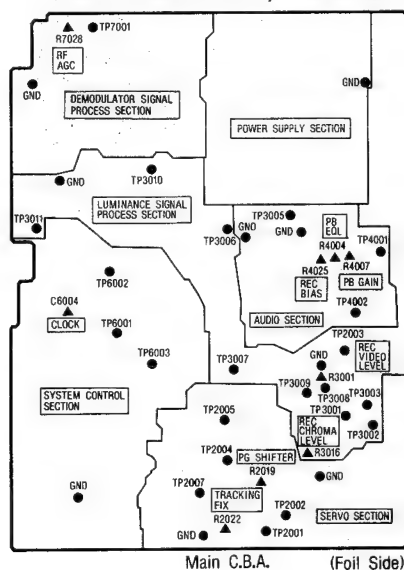


Fig. E5

2-2-1. BIAS CURRENT ADJUSTMENT

Test Point: Audio Head Terminal
Adjustment: R4025 (REC BIAS)

1. Plug in a phono plug to the Audio Input on the rear panel, but do not supply the Audio signal.
2. Insert a cassette and make a recording in the SP mode.
3. Connect the AC Millivolt Meter as shown in Fig. E6.

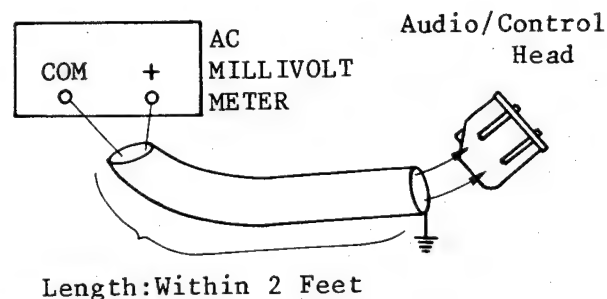
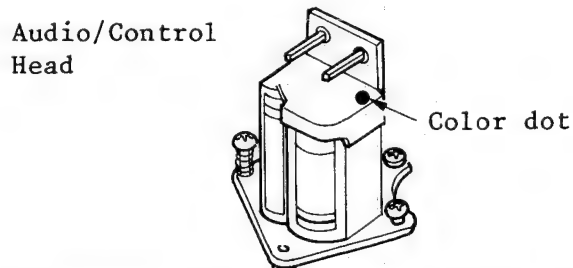


Fig. E6

4. While the recording is taking place, adjust the REC BIAS (R4025) on the Audio Section so that the voltage is within the specification.
(Specification should be decided by the color of the dot on A/C Head.)

COLOR DOT	ADJUSTMENT VOLTAGE
NO COLOR DOT	2.4 (+- 0.05) mVrms
RED COLOR	2.1 (+- 0.05) mVrms



Adjustment should be made depending on the color of the dot on the A/C head as above.

Fig. E7

5. Remove the AC Millivolt Meter.

Note:

For Service replacement, A/C Head without color dot is supplied.

2-2-2. PLAYBACK GAIN AND EQUALIZATION ADJUSTMENT

Test Point : TP4001

Adjustments: R4004 (PB EQL)
R4007 (PB GAIN)

1. Supply a sinewave signal (1kHz and 5kHz, -30dB, 89mVp-p) to the Audio Input on the rear panel.

2. Supply the video signal to the Video Input on the rear panel.
3. Connect the AC Millivolt Meter to TP4001 on the Audio Section.
4. Insert a cassette tape and make a recording 1kHz signal first then 5kHz signal in the SP mode. Read the voltage of 1kHz.
5. Playback the 1kHz portion just recorded.
6. Adjust PB GAIN (R4007) so that the voltage of playback is equal to that of recording.
7. Adjust the PB EQL (R4004) so that the 1kHz and 5kHz outputs are balanced.
8. Remove the AC Millivolt Meter.

2-3. LUMINANCE AND CHROMINANCE SECTION

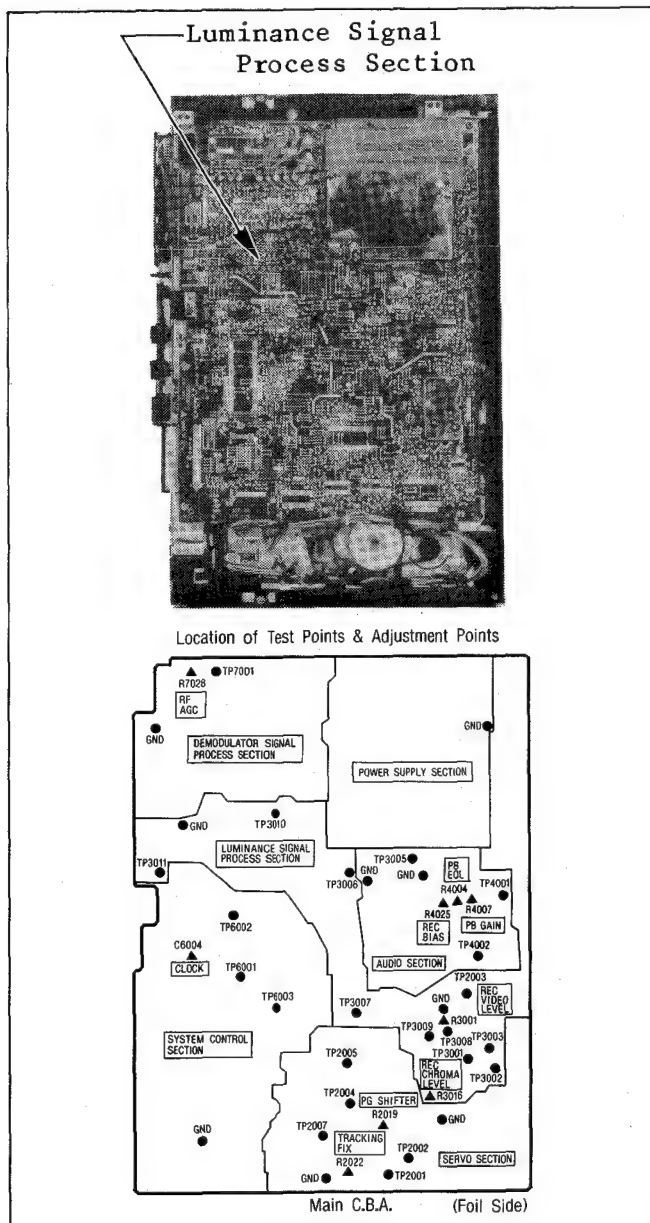


Fig. E8

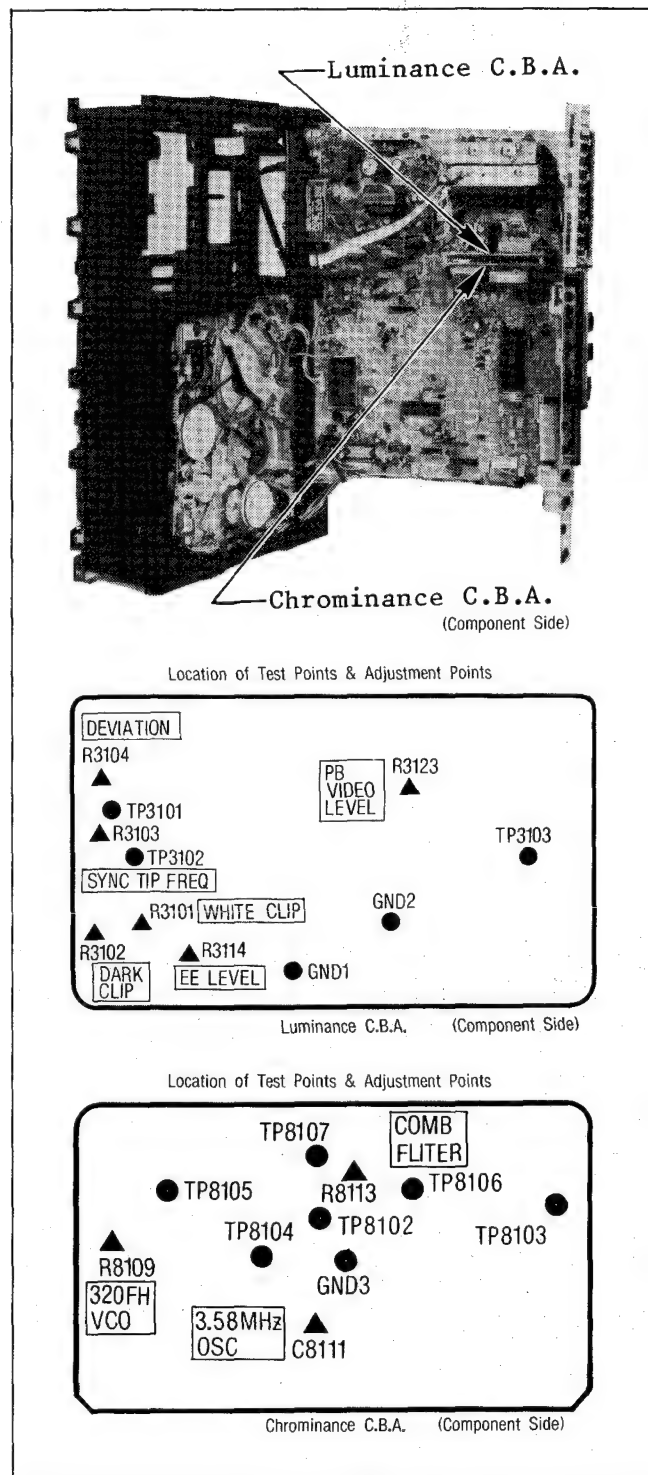


Fig. E9

Note :

Do not bend or spread apart the Luminance and Chrominance C.B.A.s. By doing so, damage to the main C.B.A. or pins on the C.B.A.s may result. Signal check of these C.B.A.s should be performed on condition that one of these C.B.A.s is removed ; soldering should be done on the foil side of the Main C.B.A.

2-3-1. E-E LEVEL ADJUSTMENT

Test Point: TP3010

Adjustment: R3114 (E-E LEVEL)

1. Supply the video signal (1Vp-p) to the Video Input on the rear panel.
2. Connect the scope to TP3010 on the Luminance Signal Process Section.
3. Place the unit in STOP mode.
4. Adjust the E-E LEVEL (R3114) on the Luminance C.B.A. so that the video level is 2.0 (+/- 0.1) Vp-p.

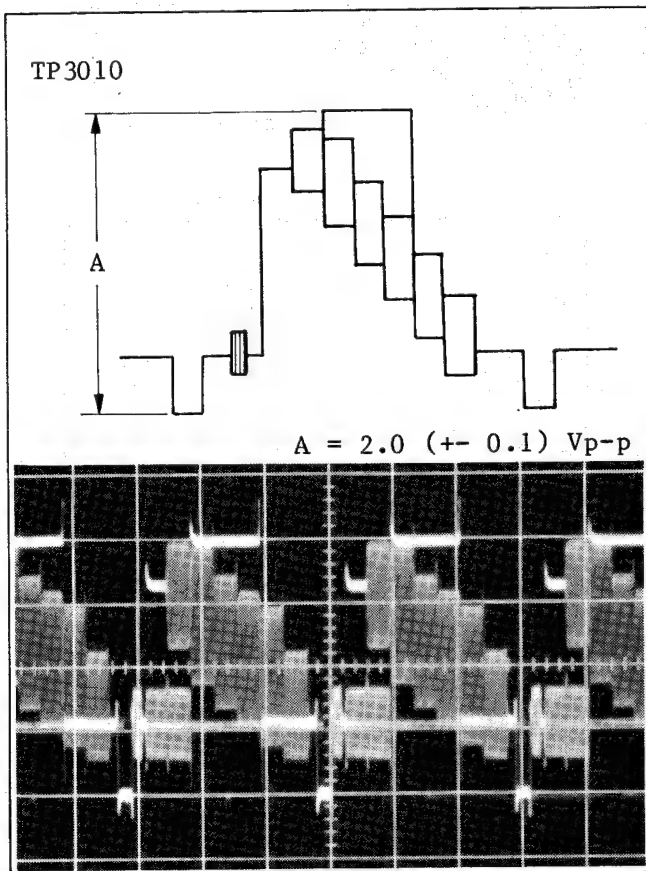


Fig. E10 TP3010 0.5V/20 u-sec. div.

2-3-2. SYNC TIP FREQUENCY AND DEVIATION ADJUSTMENT

Test Points: TP3002, TP3003, TP3009

Adjustments: R3103 (SYNC TIP FREQ)
R3104 (DEVIATION)

(A-1, Sync Tip Frequency Adjustment)

1. Plug in a phono plug to the Video Input on the rear panel, but do not supply video signal.

2. Connect the frequency counter to TP3009 on the Luminance Signal Process Section.
3. Insert a cassette and place the unit in SP REC mode.
4. Adjust the SYNC TIP FREQ (R3103) so that the frequency is 3.4 (+/- 0.04) MHz.
5. Remove the frequency counter.

(A-2, Deviation Adjustment)

6. Turn the WHITE CLIP (R3101) and the DARK CLIP (R3102) to fully counterclockwise from the component side.
7. Turn the REC VIDEO LEVEL (R3001) to fully counterclockwise and the REC CHROMA LEVEL (R3016) to fully clockwise from the component side.
8. Connect a signal generator (sinewave) to TP3008 through the resistor (1kΩ). Set the frequency and the output level of the signal generator.
Frequency : 4.35 (+/- 0.04) MHz
Output Level : 0.1Vp-p

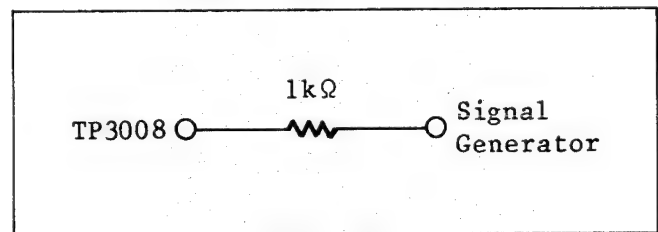


Fig. E11

9. Supply a NTSC color bar signal (1Vp-p) to the Video Input on the rear panel.
10. Connect the scope to TP3003 (HOT) and TP3002 (GND) on the Luminance Signal Process Section. Use TP3010 as a trigger.
11. Turn the DEVIATION (R3104) to fully clockwise from the component side. Then slowly Adjust the DEVIATION (R3104) so that maximum beat is produced as shown below.

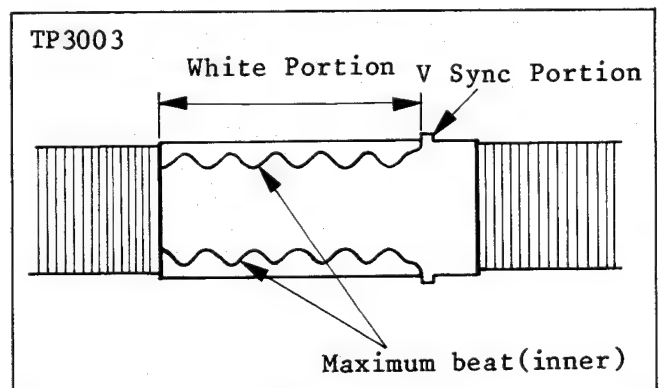


Fig. E12

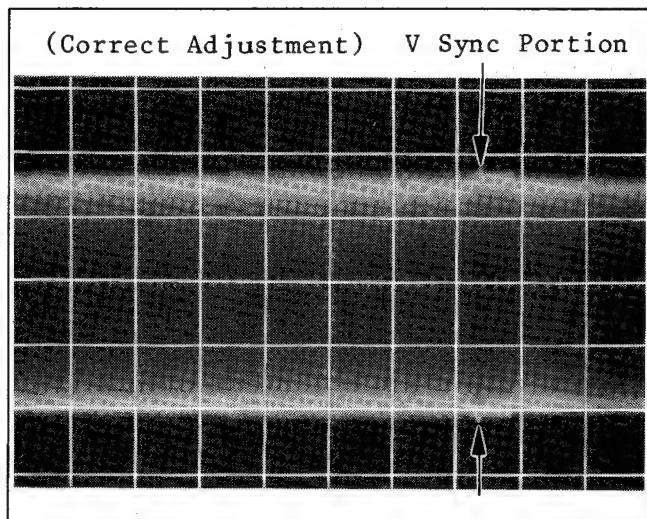


Fig. E13 TP3003 50mV/2msec. div.

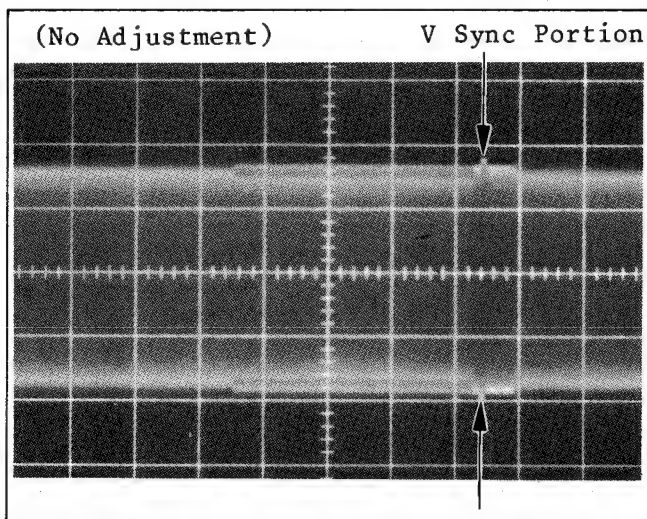


Fig. E14 TP3003 50mV/2msec. div.

Note : Inner beat is used for this adjustment but not outer beat as shown below.

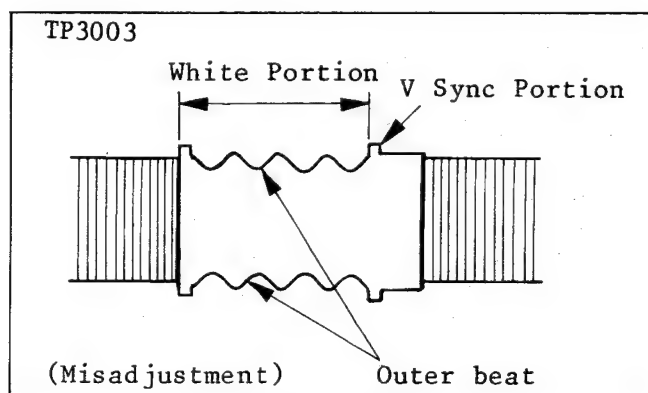


Fig. E15

12. Remove the resistor and a signal generator.
13. Make WHITE and DARK CLIP Adjustment and Recording Current Adjustment.

2-3-3. WHITE AND DARK CLIP ADJUSTMENT

Test Point : TP3101

Adjustments: R3101 (WHITE CLIP)
R3102 (DARK CLIP)

1. Supply a color bar signal to the Video Input on the rear panel.
2. Connect the scope to TP3101 on the Luminance C.B.A.
3. Place the unit in SP REC mode.
4. Adjust the WHITE CLIP (R3101) and the DARK CLIP (R3102) on the Luminance C.B.A. so that the overshoot and undershoot are as shown below.

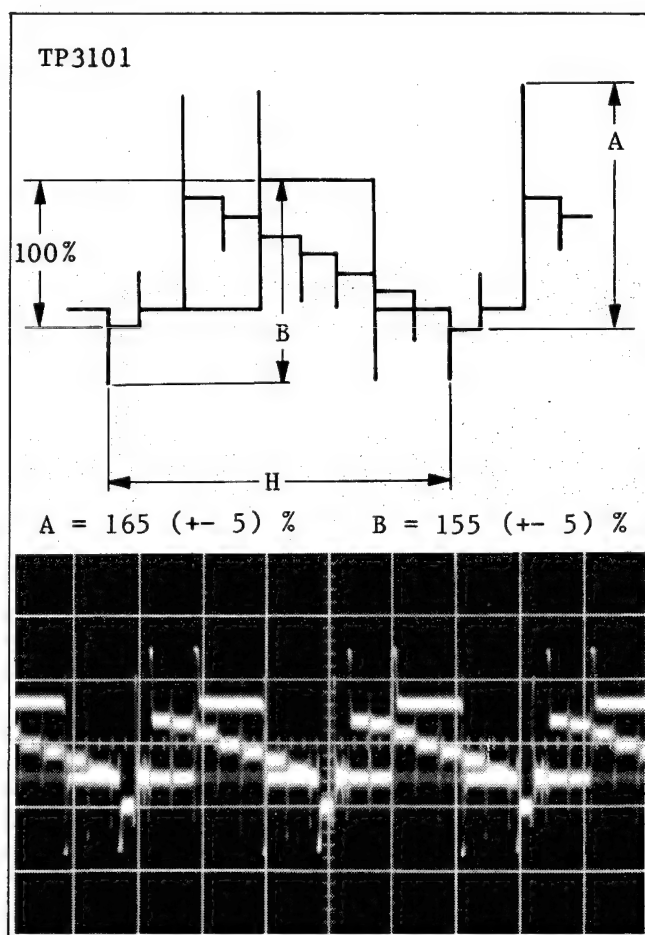


Fig. E16 TP3101 0.2V/20 u-sec. div.

2-3-4. RECORDING CURRENT ADJUSTMENT

Test Points: TP3002, TP3003

Adjustments: R3001 (REC VIDEO LEVEL)
R3016 (REC CHROMA LEVEL)

1. Supply a color bar signal to the Video Input on the rear panel.

2. Insert a cassette tape and make a recording in the SP mode.
3. Connect the scope between TP3003 (HOT) and TP3002 (GND) on the Luminance Signal Process Section.
4. Turn the REC VIDEO LEVEL (R3001) fully clockwise from the component side.
5. Set the scope 20mV/div., 20 u-sec/div. Use TP3010 as scope trigger.
6. Adjust the REC CHROMA LEVEL (R3016) on the Luminance Signal Process Section so that the level of cyan portion is 36 (± 3) mVp-p.

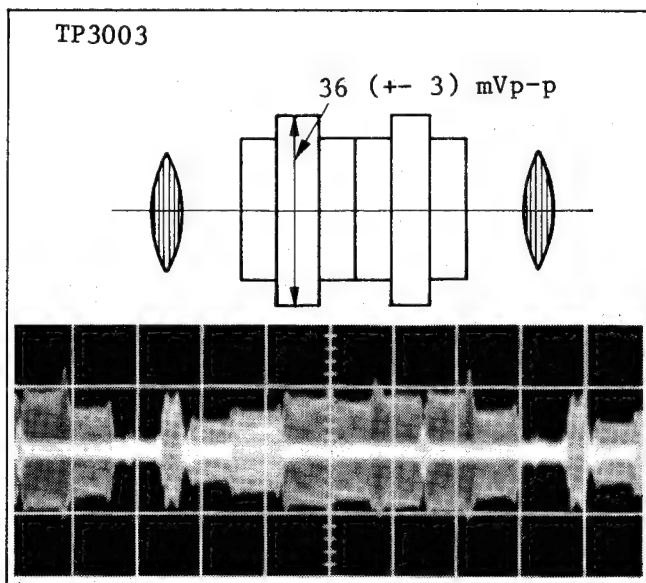


Fig. E17 TP3003 20mV/20 u-sec. div.

7. Then set the scope 20mV-div., 2msec/div. Use TP2003 as scope trigger.
8. Adjust the REC VIDEO LEVEL (R3001) on the Luminance Signal Process Section so that the level of V sync portion is 140 (± 3) mVp-p.

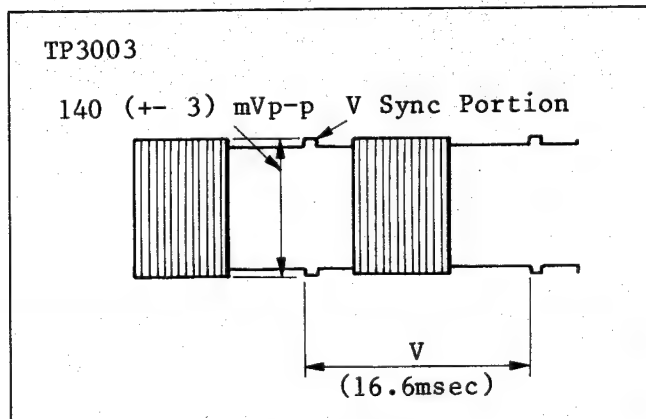


Fig. E18

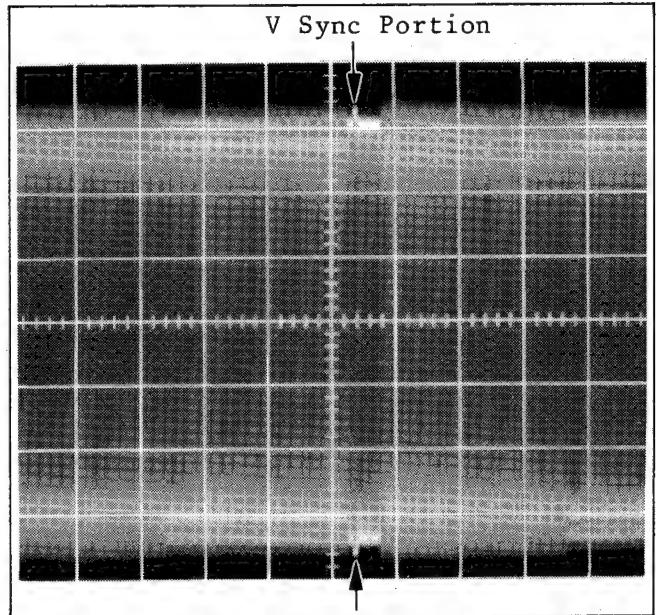


Fig. E19 TP3003 20mV/2msec. div.

2-3-5. 320FH VCO ADJUSTMENT

Test Point: TP8103
Adjustment: R8109 (320FH VCO)

1. Place the unit in STOP mode.
2. Connect the test point (TP8105) to Pin 3 of Chrominance C.B.A. through the resistor (1k Ω) and the diodes (MA165).

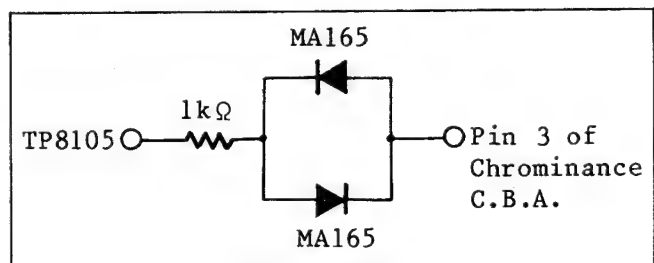


Fig. E20

3. Connect the frequency counter to TP8103 on the Chrominance C.B.A.
4. Adjust the 320FH VCO (R8109) from the component side on the Chrominance C.B.A. so that the frequency is 4.2 (± 0.1) MHz.
5. Remove the frequency counter.

2-3-6. 3.58MHz OSC ADJUSTMENT

Test Point: TP8104
Adjustment: C8111 (3.58MHz OSC)

1. Place the unit in STOP mode.

2. Connect the test point (TP8102) to GND on the Chrominance C.B.A. through the resistor ($22k\Omega$) and the capacitor ($0.01 \mu\text{-F}$).

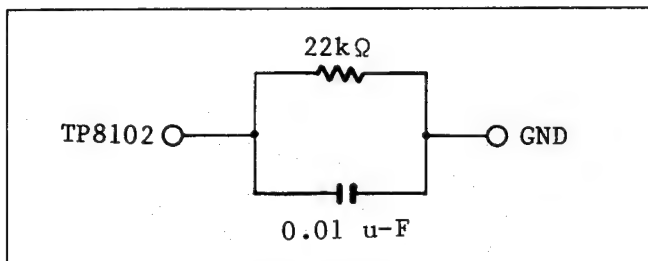


Fig. E21

3. Connect the frequency counter to TP8104 on the Chrominance C.B.A.
4. Adjust the 3.58MHz OSC (C8111) from the component side on the Chrominance C.B.A. so that the frequency is 3.579545 MHz (± 20) Hz.
5. Remove the frequency counter.

2-3-7. COMB FILTER ADJUSTMENT

Test point: TP3010
Adjustment: R8113 (COMB FILTER)

1. Supply a color bar signal to the Video Input on the rear panel.
2. Insert a cassette and make a recording in the SLP mode.
3. Connect the scope to TP3010 on the Luminance Signal Process Section.
4. Playback the portion just recorded.
5. Turn the Tracking Control on the front panel for the poorest tracking. (Worst playback image.)
6. During playback, adjust the COMB FILTER (R8113) on the Chrominance C.B.A. from the component side as shown below.

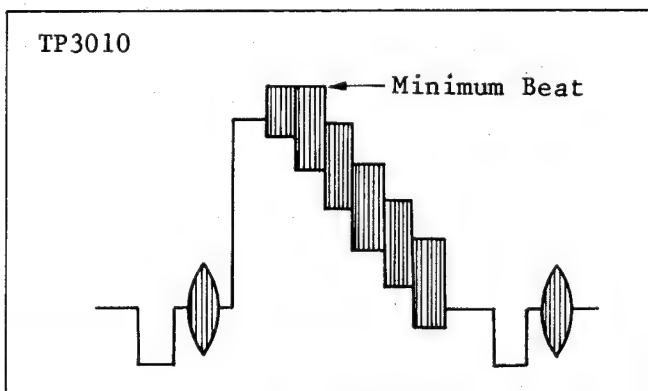


Fig. E22

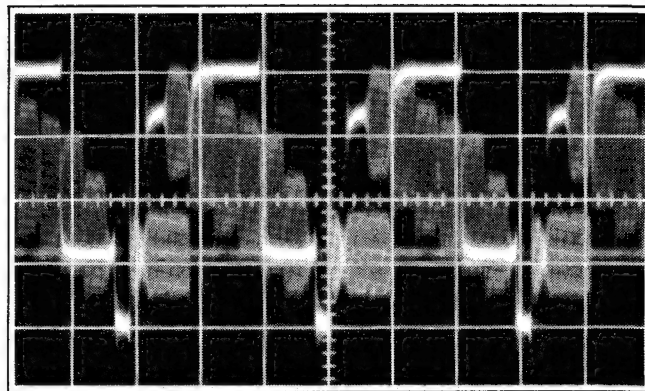


Fig. E23 TP3010 0.5V/20 μ-sec. div.

2-3-8. PLAYBACK LEVEL ADJUSTMENT

Test Point: TP3010
Adjustment: R3123 (PB VIDEO LEVEL)

1. Supply a color bar signal ($1V_{p-p}$) to the Video Input on the rear panel.
2. Insert a cassette and make a recording in the SP mode for a few minutes.
3. Connect the scope to TP3010 on the Luminance Signal Process Section.
4. Playback the portion just recorded.
5. During playback, adjust the PB VIDEO LEVEL (R3123) on the Luminance C.B.A. so that the video level is $2.0 (\pm 0.1) V_{p-p}$.
6. Confirm that the level of cyan portion is $1.36 (\pm 0.2) V_{p-p}$.

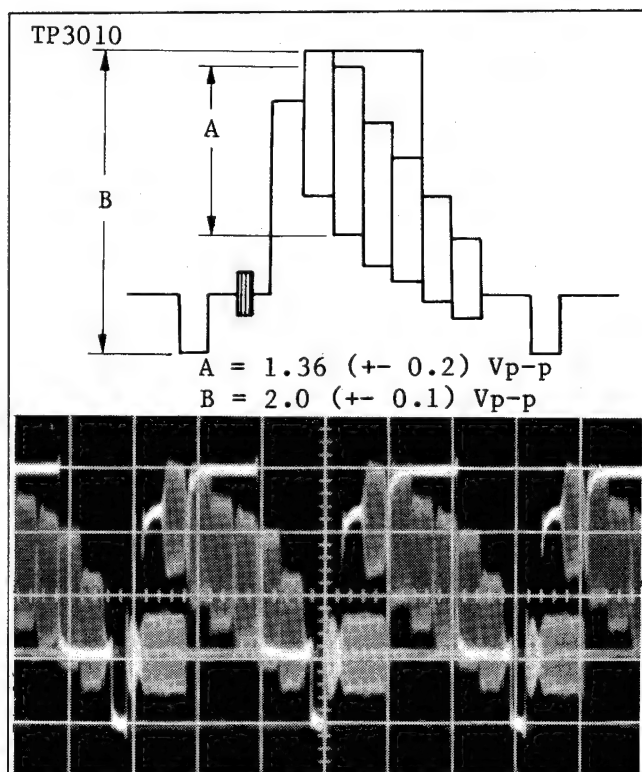


Fig. E24 TP3010 0.5V/20 μ-sec. div.

2-4. SYSTEM CONTROL SECTION

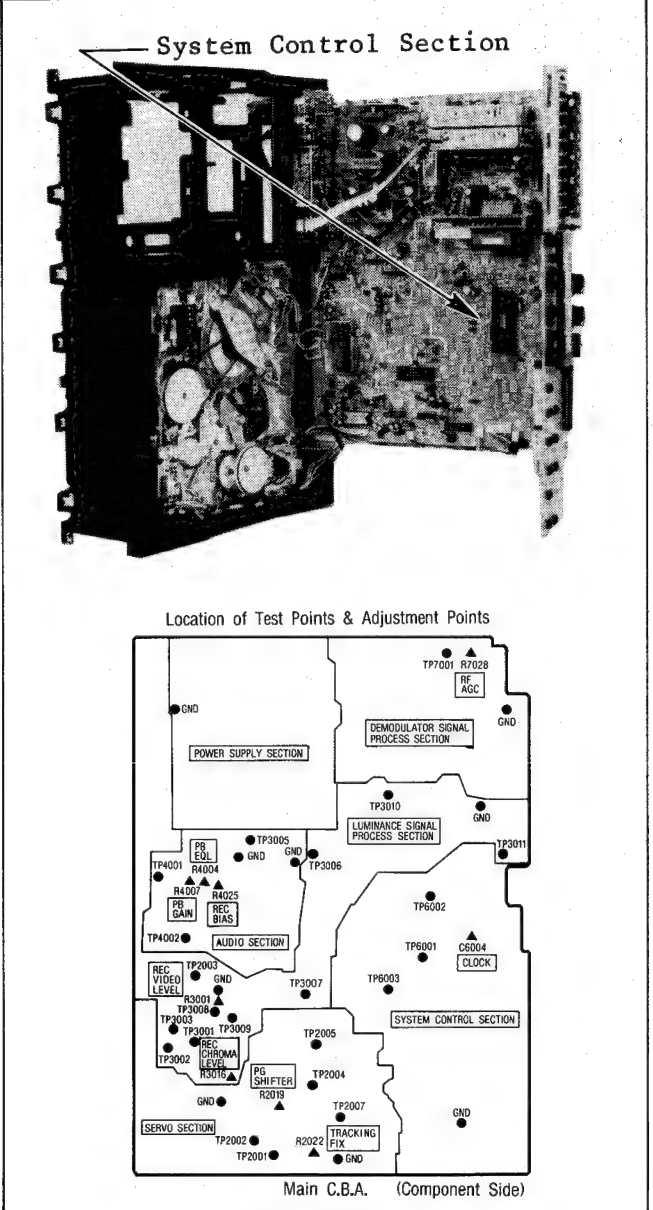


Fig. E25

2-4-1. CLOCK ADJUSTMENT

Test Point: TP6001
Adjustment: C6004 (CLOCK)

1. Connect the frequency counter with 10:1 Probe to TP6001 on the System Control Section.
2. Adjust the CLOCK (C6004) from the component side so that the frequency at TP6001 is 349.525 (+- 0.01) kHz.
3. Remove the frequency counter.

2-5. TV DEMODULATOR SECTION

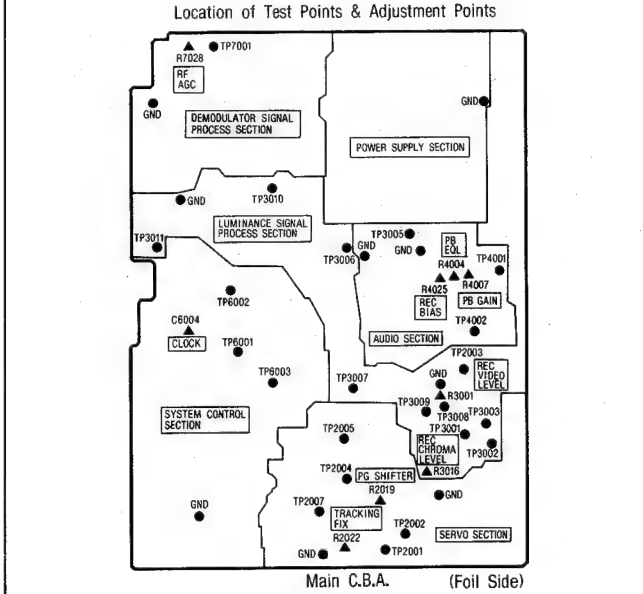
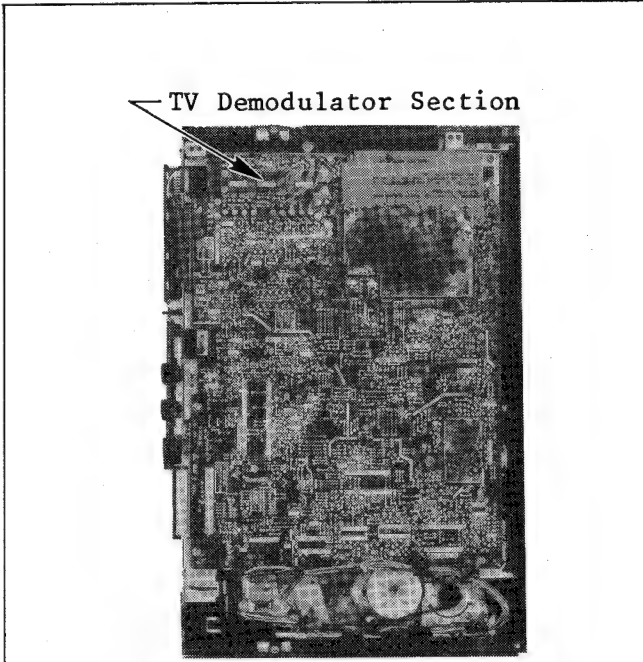


Fig. E26

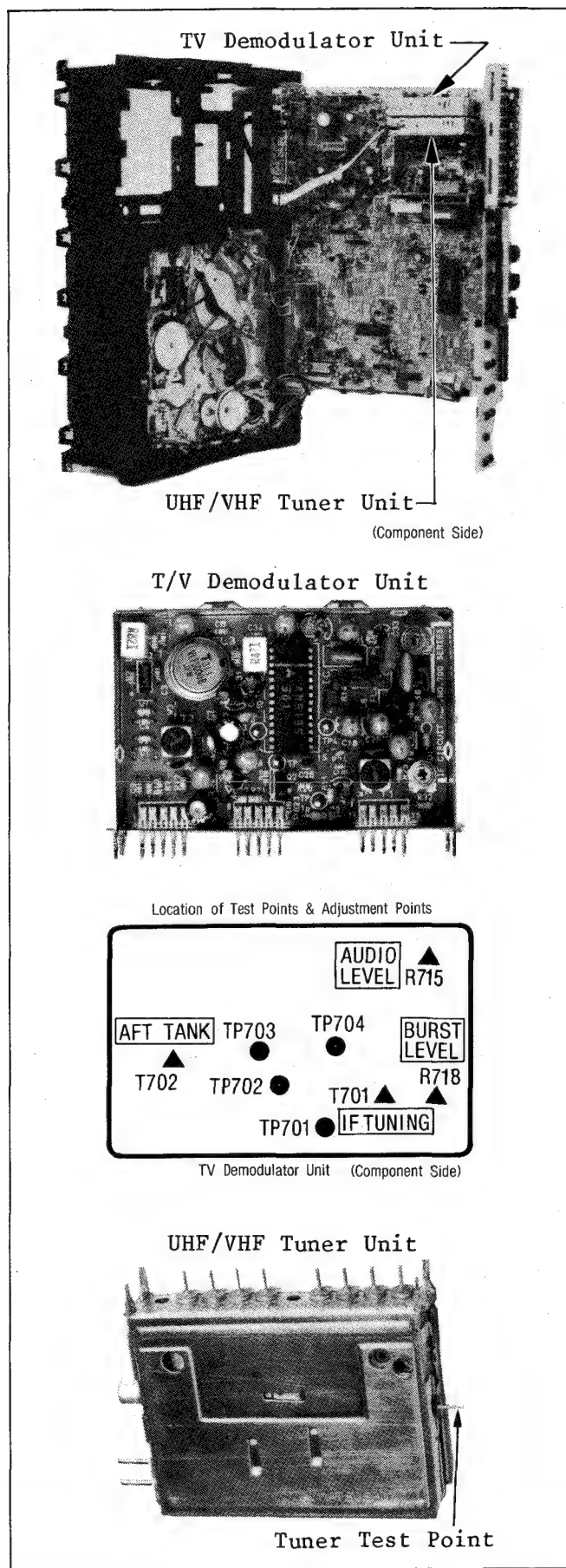


Fig. E27

2-5-1. VIF OVERALL CONFIRMATION AND VCO ADJUSTMENT

Test Points: TP703, TP704

Adjustment : T701 (VCO)

(CAUTION)

Since the TV Demodulator Unit and UHF/VHF Tuner Unit have already been factory adjusted, do not try to adjust unless absolutely necessary.

A: Factory Adjustment

A-1. VIF Overall Confirmation

1. Connect the VIF Sweep Generator/Trap Adjuster and Monitor Scope as shown below.

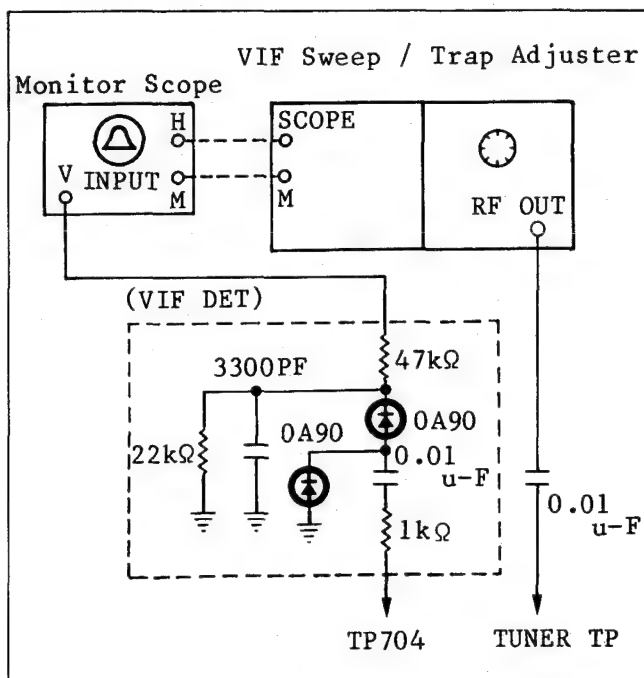


Fig. E28

2. Connect the output of the VIF Sweep Generator to tuner test point on the UHF/VHF Tuner Unit.
3. Connect the V Input of the Monitor Scope to TP704 on the TV Demodulator Unit through VIF Detector.
4. Control to Channel 13.
5. Set the AFT switch to "OFF" position.
6. Connect the DC Power Supply Unit to TP701 on the TV Demodulator Unit.
7. Connect TP702 and GND with a 3.3 u-F/25V capacitor.
8. Adjust the VCO (T701) so that the beat portion is at center as shown in Fig. E30.

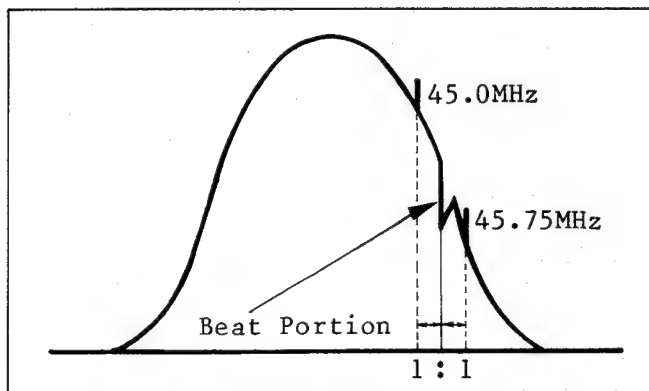


Fig. E29

9. Set the voltage on the TP701 so that the waveform level is maximum.
10. Adjust the output of the VIF Sweep Generator so that the A level is 1.0Vp-p.

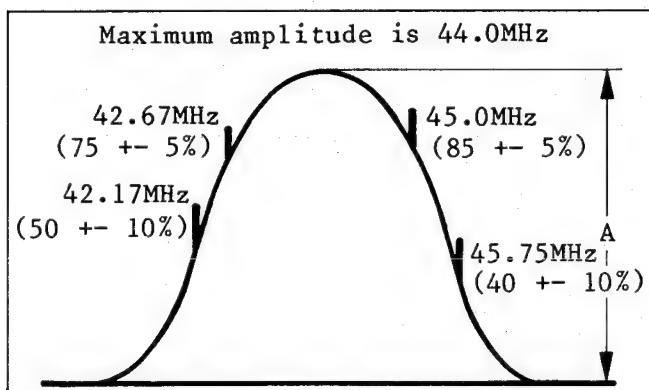


Fig. E30

11. Increase the VIF Sweep Generator output by 25dB.
12. Adjust the output of the DC Power Supply Unit so that the A portion becomes 1.0Vp-p.
13. Confirm that the Sweep output waveform is as shown in Fig. E30.
14. Adjust the VCO (T701) so that the Beat portion is 45.75MHz marker as shown below.

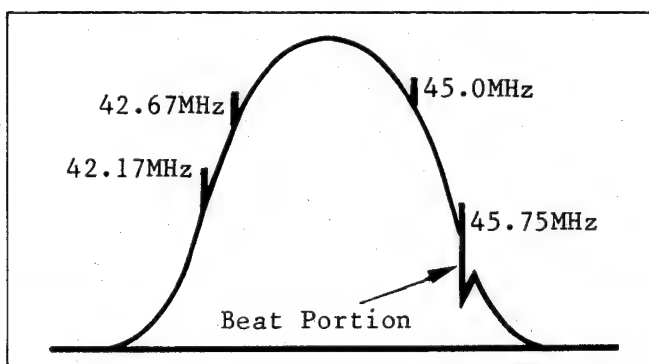


Fig. E31

15. Remove the capacitor.

A-2. VCO Adjustment

1. Adjust the DC Power Supply Unit output by 0V.
2. Connect a 3.3 u-F/25V capacitor between TP702 and GND.
3. Connect the Frequency Counter to TP703 on the TV Demodulator Unit through a Tuning Amp.

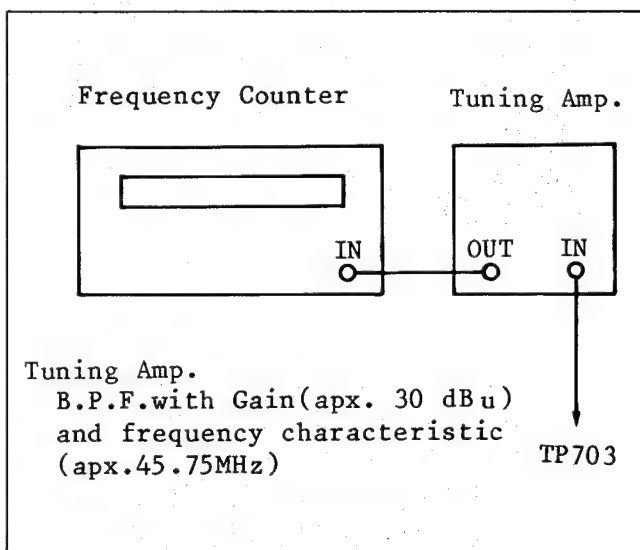


Fig. E32

4. Adjust the VCO (T701) so that the frequency is 45.75 (+/- 0.02) MHz
5. Remove the capacitor.

B. Field Adjustment

1. Supply the NTSC standard color bar signal to the RF Input on the rear panel and tune this signal.
2. Connect the scope to TP704 on the TV Demodulator Unit.
3. Adjust the VCO (T701) so that the waveform is as shown below.

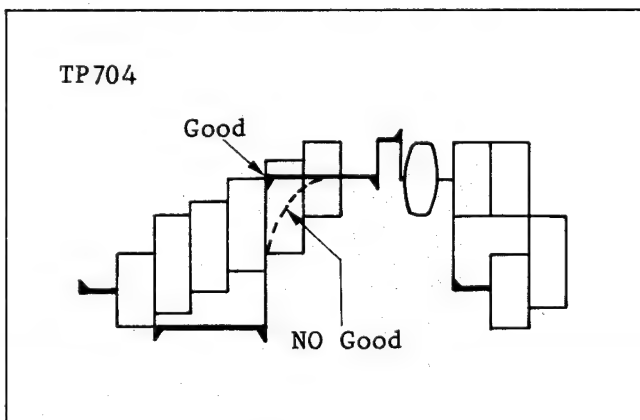


Fig. E33

2-5-2. AFT TANK ADJUSTMENT

Test Point: Tuner Test Point (TP)
Adjustment: T702 (AFT)

1. Tune in a local TV program on Channel 4.
2. Connect the frequency counter to tuner test point on the UHF/VHF Tuner Unit through a 10k Ω resistor and a 10PF capacitor.

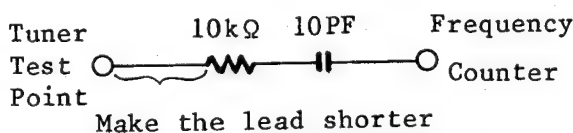


Fig. E34

3. Set the AFT switch on the front panel to "OFF".
4. Adjust the tuning VR on the front panel so that the frequency is 113.00 (± 0.01) MHz.
5. Set the AFT switch on the front panel to "ON".
6. Adjust the AFT (T702) so that the frequency is 113.00 (± 0.005) MHz.
7. Remove the frequency counter.

2-5-3. BURST LEVEL ADJUSTMENT

Test Point: Pin 10 of TV Demodulator Unit
Adjustment: R718 (BURST LEVEL)

1. Supply the NTSC standard color bar signal to the RF Input on the rear panel and tune this signal.
2. Connect the scope to Pin 10 of TV Demodulator Unit.
3. Confirm that the video level at Pin 10 of TV Demodulator Unit is 1.0 (± 0.2) Vp-p.
4. Adjust the BURST LEVEL (R718) so that the burst level is 22 (± 1) % of video level.
5. Confirm that the sync level is more than 24% of video level.

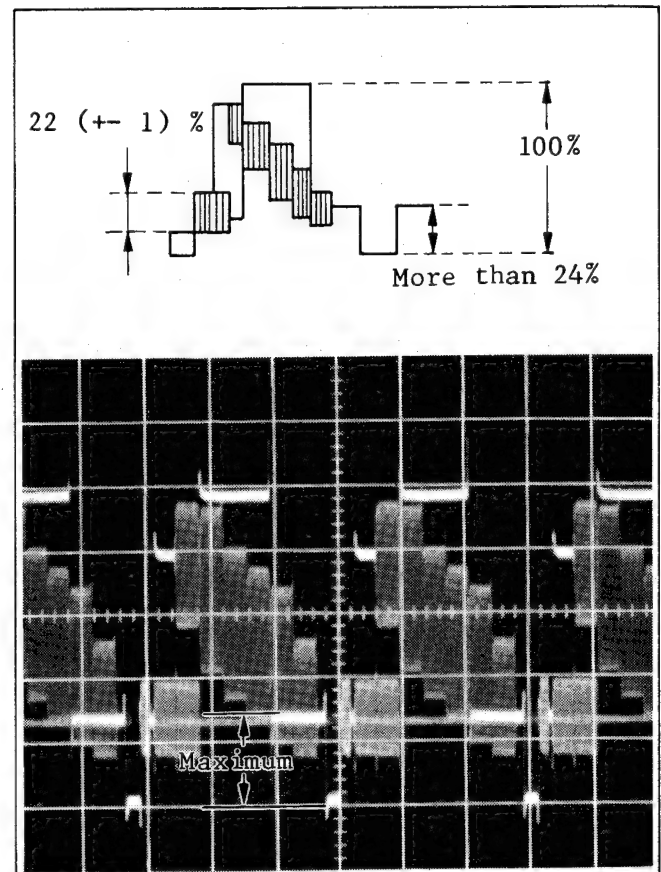


Fig. E35 Pin 10 of TV Demodulator Unit
0.2V/20 u-sec. div.

2-5-4. AUDIO LEVEL ADJUSTMENT

Test Point: Pin 15 of the
TV Demodulator Unit
Adjustment: R715 (AUDIO LEVEL)

1. Supply TV RF signal with audio modulation of 400Hz at 30% to the RF Input on the rear panel.
2. Connect the scope between Pin 15 of the TV Demodulator Unit and GND.
3. Set the AFT switch on the front panel to "ON".
4. Adjust the AUDIO LEVEL (R715) so that the level is 140 (± 10) mVp-p.

2-5-5. RF AGC ADJUSTMENT

Test Point: TP7001
Adjustment: R7028 (RF AGC)

A: Factory Adjustment

1. Tune in a color bar signal (VHF).
2. Set the AFT switch on the front panel to "ON".

3. Set the input level of electric field to 63 (+- 1) dBu.
(Using the Attenuator and Spectrum Analyzer)
4. Connect the scope to TP7001 on the Demodulator Signal Process Section.
5. Turn the RF AGC (R7028) on the Demodulator Signal Process Section fully counterclockwise from foil side.
6. Then slowly turn the RF AGC (R7028) till just before the voltage drops.
7. Change the input electric field from 63 dBu to 66 dBu.
8. Confirm that the voltage at TP7001 has dropped more than 1.0V.

B: Field Adjustment

1. Supply a local TV Signal to the RF Input on the rear panel and tune this signal.
2. Set the AFT switch on the front panel to "ON".
3. Connect the scope to pin 10 of TV Demodulator Unit and GND.
4. Adjust the RF AGC (R7028) so that the H-sync is Maximum and it's shape can be observed clearly.

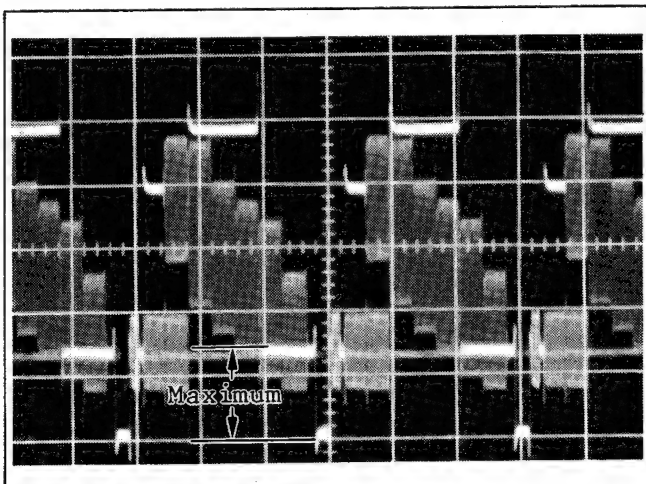


Fig. E36 Pin 10 of TV Demodulator Unit
0.2V/20 u-sec. div.

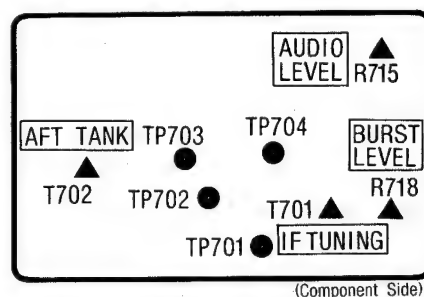
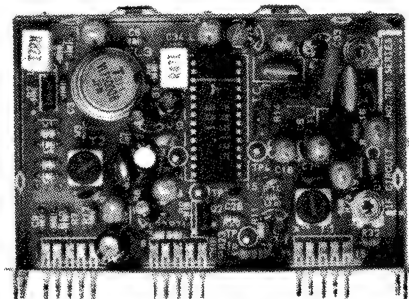
5. Confirm that the noise band and beat does not appear on the TV screen.

Note:

This procedure is just a simplified method. So use the factory Adjustment for a more accurate or interchangeable adjustment.

TV Demodulator Unit

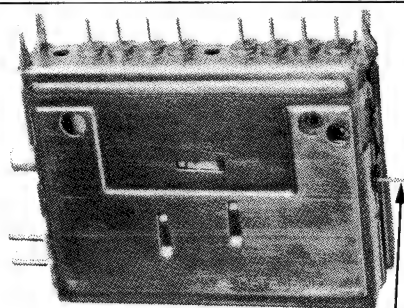
VEQS0257



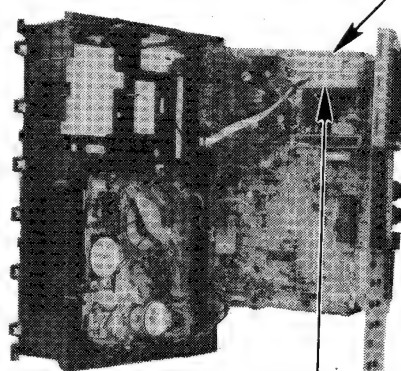
UHF/VHF Tuner Unit

TNV56751F2R (PV-1230)

TNV76755F2R (PV-1222, PV-1225)

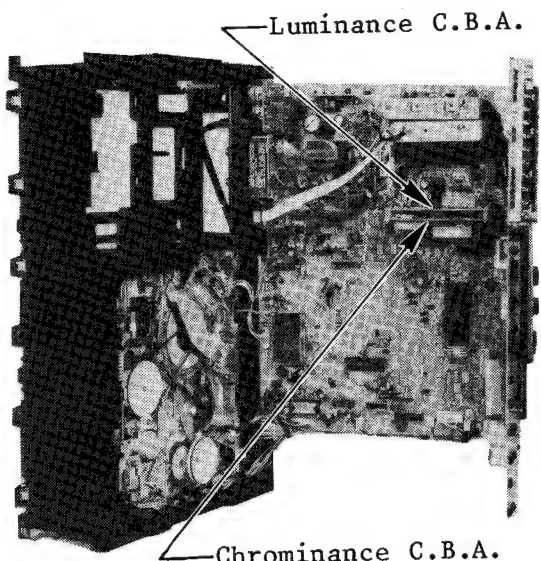
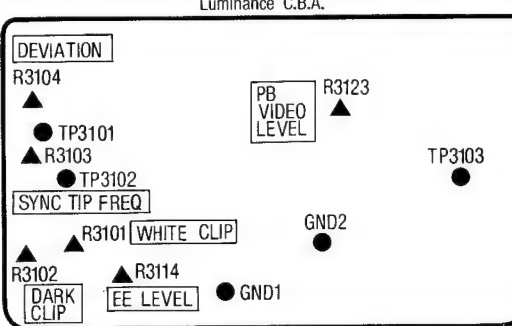
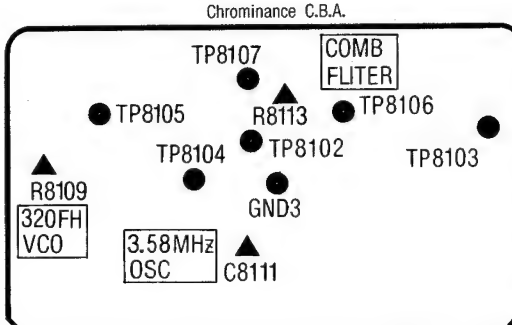
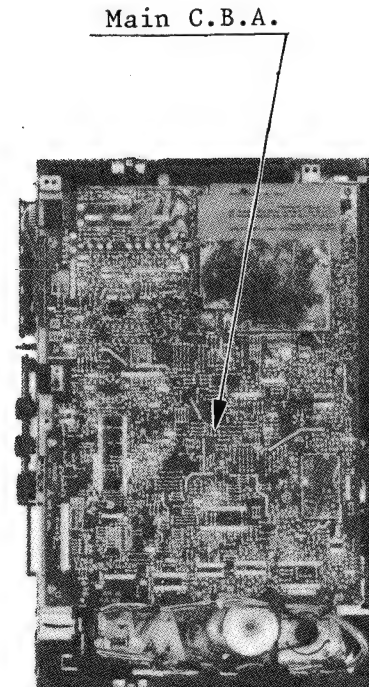
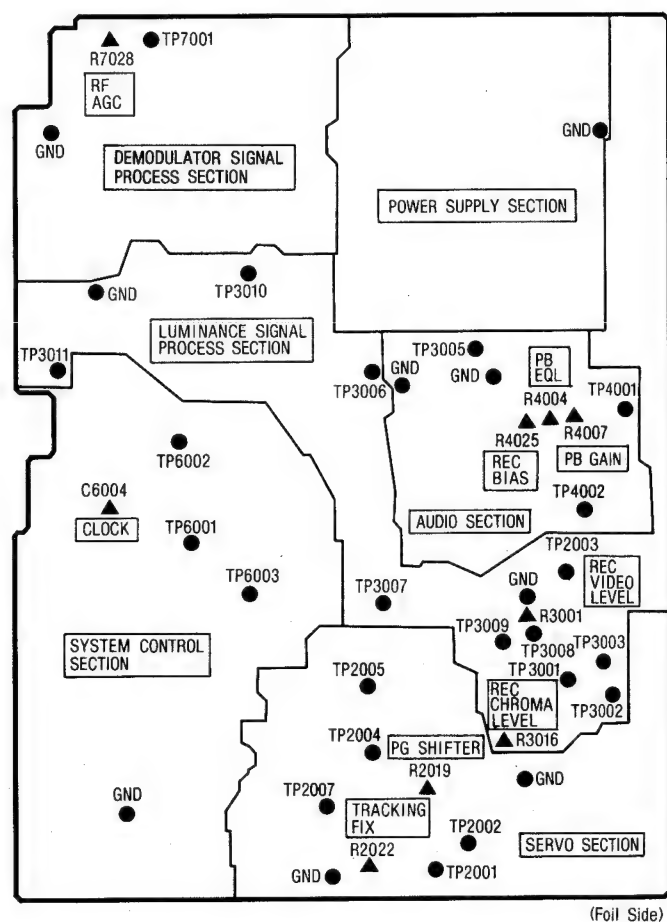
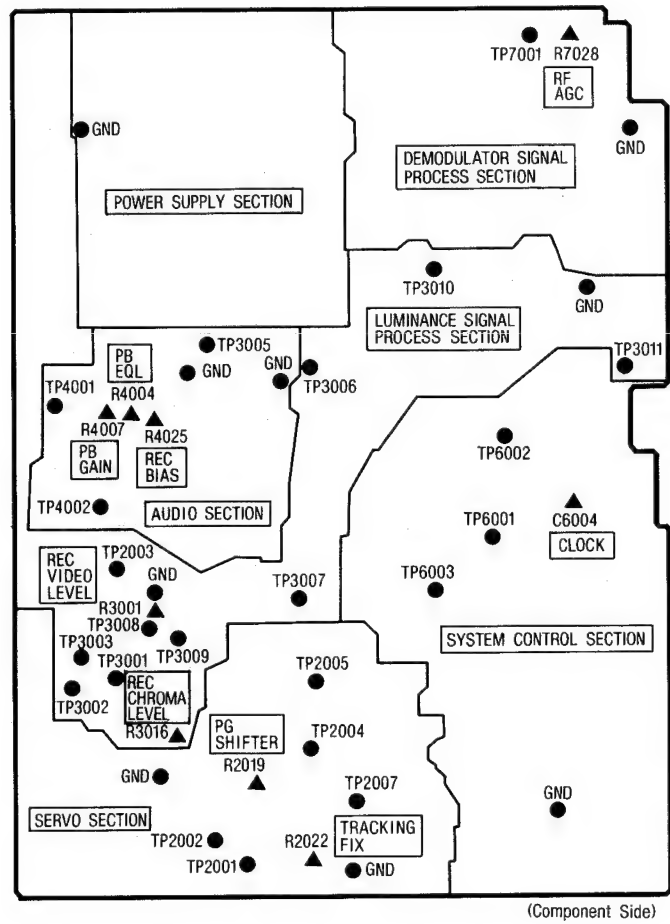


Tuner Test Point
TV Demodulator Unit



UHF/VHF Tuner Unit

Location of Test Points and Adjustment Points

Luminance & Chrominance C.B.A.	Main C.B.A.	
<p data-bbox="368 346 765 380">VEPS0337A/VEPS0806A</p> <div data-bbox="326 422 831 947"><p data-bbox="566 430 819 455">Luminance C.B.A.</p><p data-bbox="513 921 792 947">Chrominance C.B.A.</p></div> <div data-bbox="341 1050 819 1354"><p data-bbox="513 1041 644 1058">Luminance C.B.A.</p><p data-bbox="685 1354 804 1371">(Component Side)</p></div> <div data-bbox="341 1474 819 1778"><p data-bbox="513 1465 644 1482">Chrominance C.B.A.</p><p data-bbox="685 1787 804 1803">(Component Side)</p></div>	<p data-bbox="1706 346 2237 413">VEPS0336A1 (PV-1230) VEPS0336C1 (PV-1222, PV-1225)</p> <div data-bbox="1706 795 2050 1438"><p data-bbox="1786 804 1970 829">Main C.B.A.</p></div> <div data-bbox="991 745 1614 1608"><p data-bbox="1534 1591 1599 1608">(Foil Side)</p></div> <div data-bbox="2169 735 2795 1600"><p data-bbox="2662 1583 2781 1600">(Component Side)</p></div>	

Service Manual

Video Cassette Recorder

Panasonic
 Omnivision **VHS**
PV-1230
PV-1222
PV-1225
Vol. 3

Block Diagrams

SPECIFICATIONS

Power Source: 120V AC $\pm 10\%$, 60Hz $\pm 0.5\%$
 Power Consumption: Approx. 18 watts
 Television System: EIA Standard (525 lines, 60 fields)
 NTSC color signal

Video Recording

System: 2 rotary heads, helical scanning system
 Luminance: FM azimuth recording
 Color signal: Converted subcarrier phase shift recording

Audio Track: 1 track

Tape Format: Tape width 1/2" (12.7mm), high density tape

Tape Speed: SP mode: 1-5/16 i.p.s. (33.35mm/s)
 LP mode: 21/32 i.p.s. (16.67mm/s)
 SLP mode: 7/16 i.p.s. (11.12mm/s)

Record/Playback Time: 8 HRS. with 160 min. type tape used in SLP mode

FF/REW Time: Less than 6 min. with 120 min. type tape

Heads: Video: 2 rotary heads
 Audio/Control: 1 stationary head
 Erase: 1 full track erase
 1 audio track erase

Input Level: Video: VIDEO IN Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO IN Jack (RCA type)
 -20dB, 50k Ω unbalanced

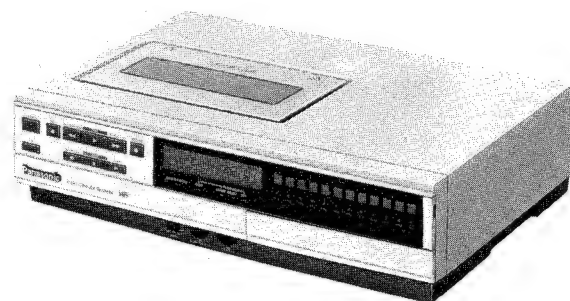
TV Tuners: VHF Input: VHF Ch2-Ch13,
 75 Ω unbalanced
 UHF Input: Ch14-Ch83,
 300 Ω balanced

Output Level: Video: VIDEO OUT Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO OUT Jack (RCA type)
 -6dB, 600 Ω unbalanced

RF Modulated: Ch3/Ch4 switchable,
 72dB μ , (Open Voltage)
 75 Ω unbalanced

Video Horizontal

Resolution: Color: more than 230 lines
 B/W: more than 230 lines



Audio Frequency

Response: SP mode: 100Hz ~ 8kHz
 (10dB down) LP mode: 100Hz ~ 6kHz
 SLP mode: 150Hz ~ 5kHz

Signal-to-Noise Ratio: Video: SP mode: better than 41dB
 LP mode: better than 41dB
 SLP mode: better than 41dB
 (Rohde & Schwarz noise meter)
 Audio: SP mode: better than 42dB
 LP mode: better than 40dB
 SLP mode: better than 40dB

Operation

Temperature: 41°F—104°F (5°C—40°C)
 Operating Humidity: 10%—75%
 Weight: 13.0 lbs. (5.9kg)
 Dimensions: 16-15/16"(W) \times 11-5/8"(D) \times 4-1/4"(H)
 (430mm \times 295mm \times 108mm)

Accessories Supplied: • Remote control unit
 • VHF connecting cable
 • 300 Ω —75 Ω transformer
 • Twin-lead cable

Available Tapes:

1/2" VHS video cassette tapes
 NV-T160 Approx. 1073ft. (327m), 160,
 320, or 480 min
 NV-T120 Approx. 810ft. (247m), 120, 240,
 or 360 min
 NV-T60 Approx. 417ft. (127m), 60, 120,
 or 180 min.

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

Panasonic®

Matsushita Engineering & Service Company
 Division of Matsushita Electric
 Corporation of America
 50 Meadowland Parkway, Secaucus,
 New Jersey 07094

Panasonic Hawaii Inc.
 91-238 Kauhū St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

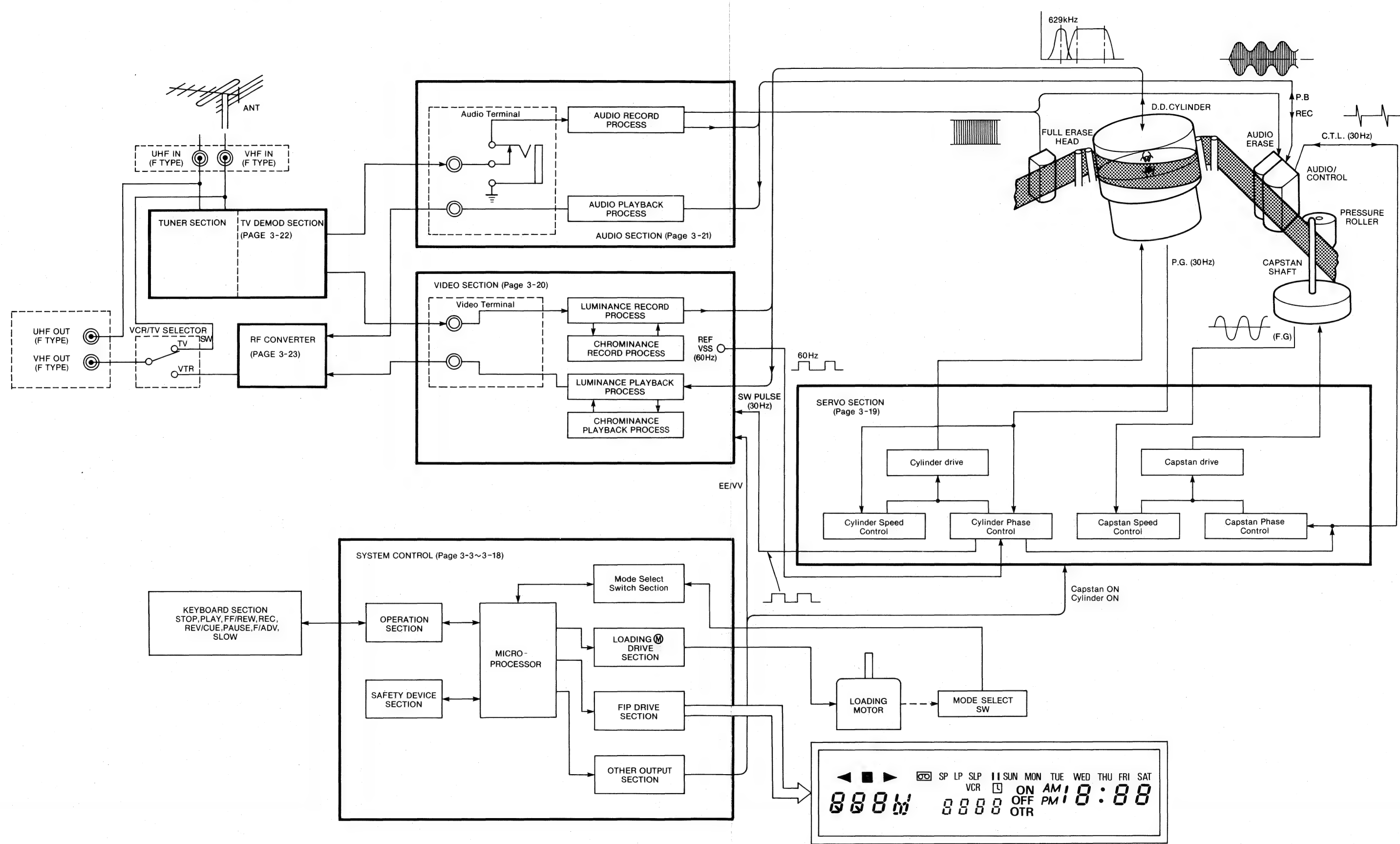
Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Infantería, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

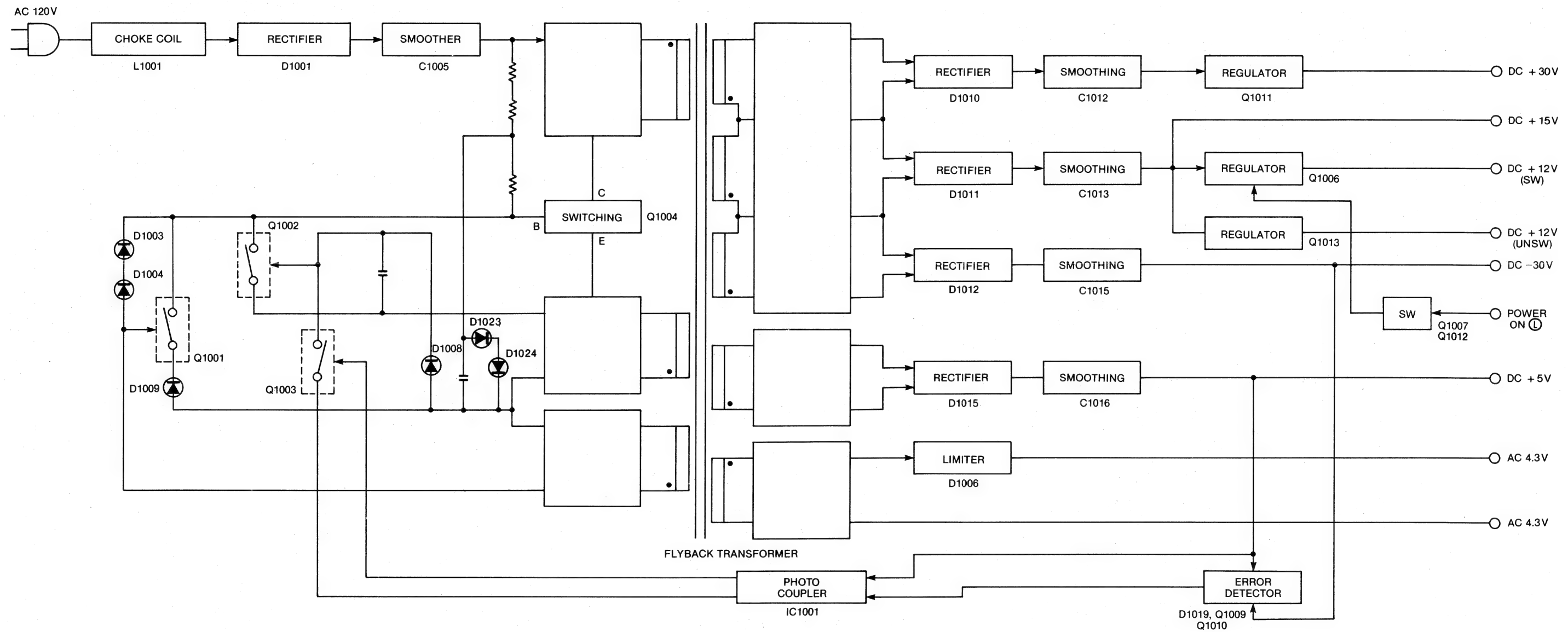
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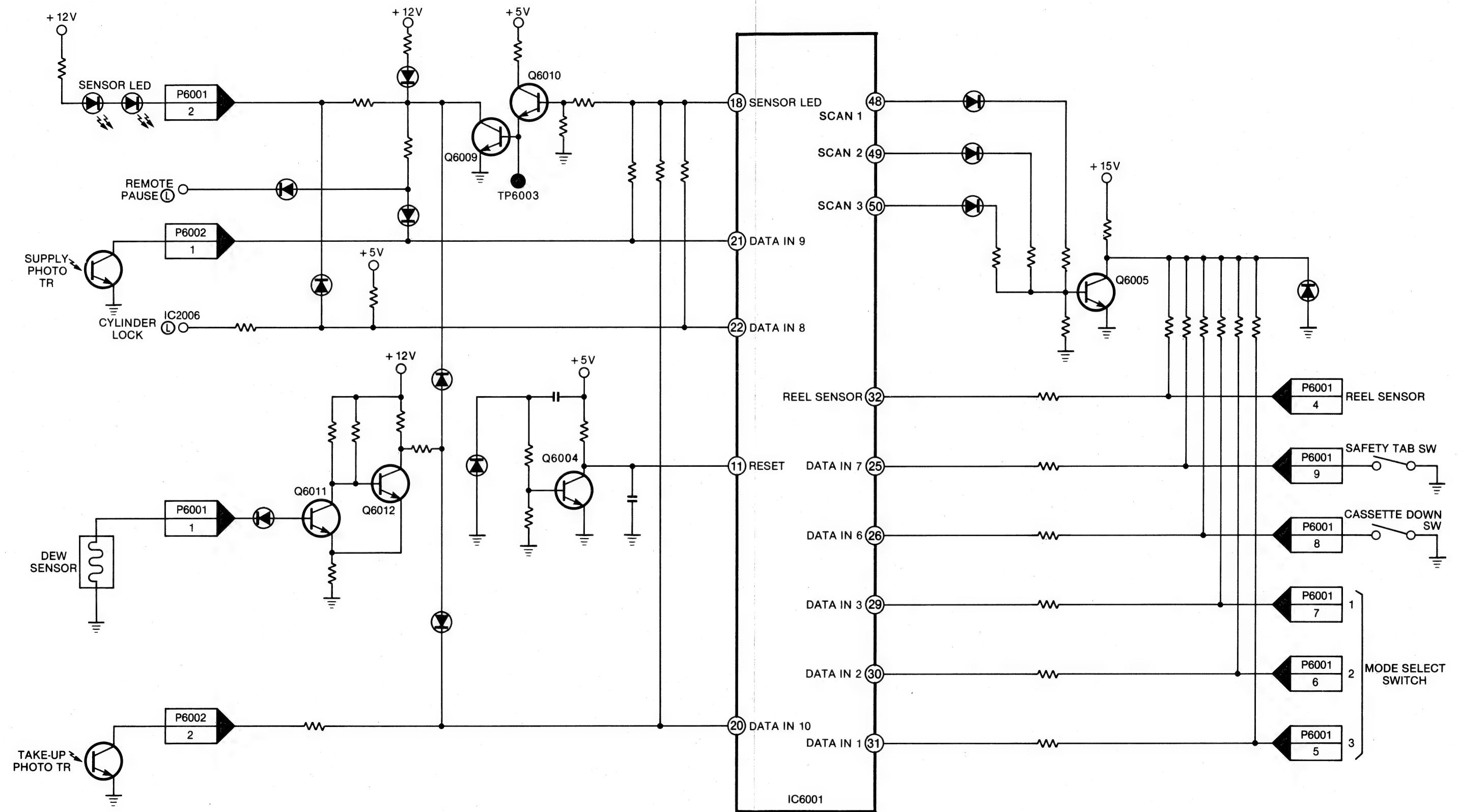
OVERALL BLOCK DIAGRAM



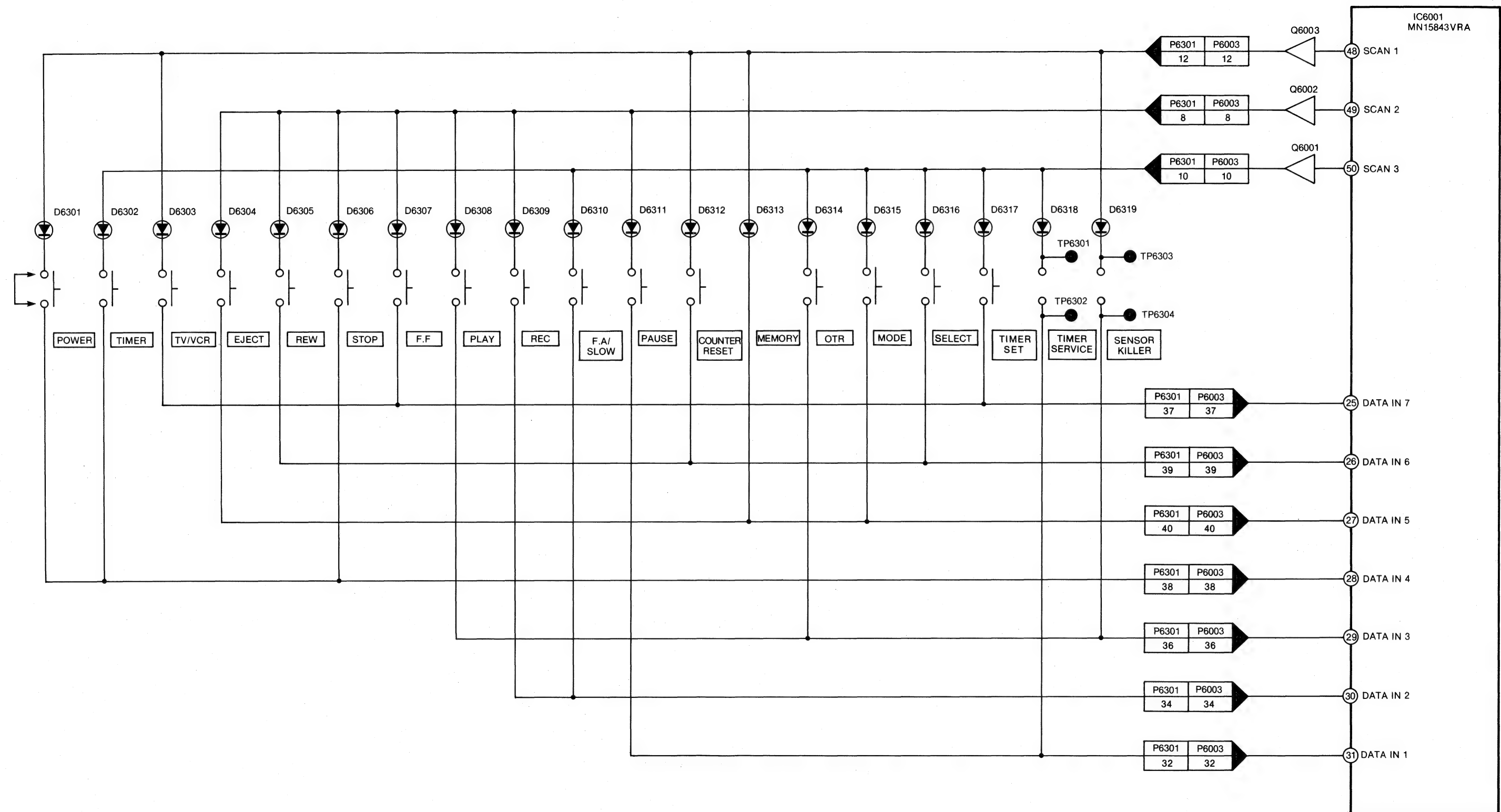
POWER SUPPLY BLOCK DIAGRAM



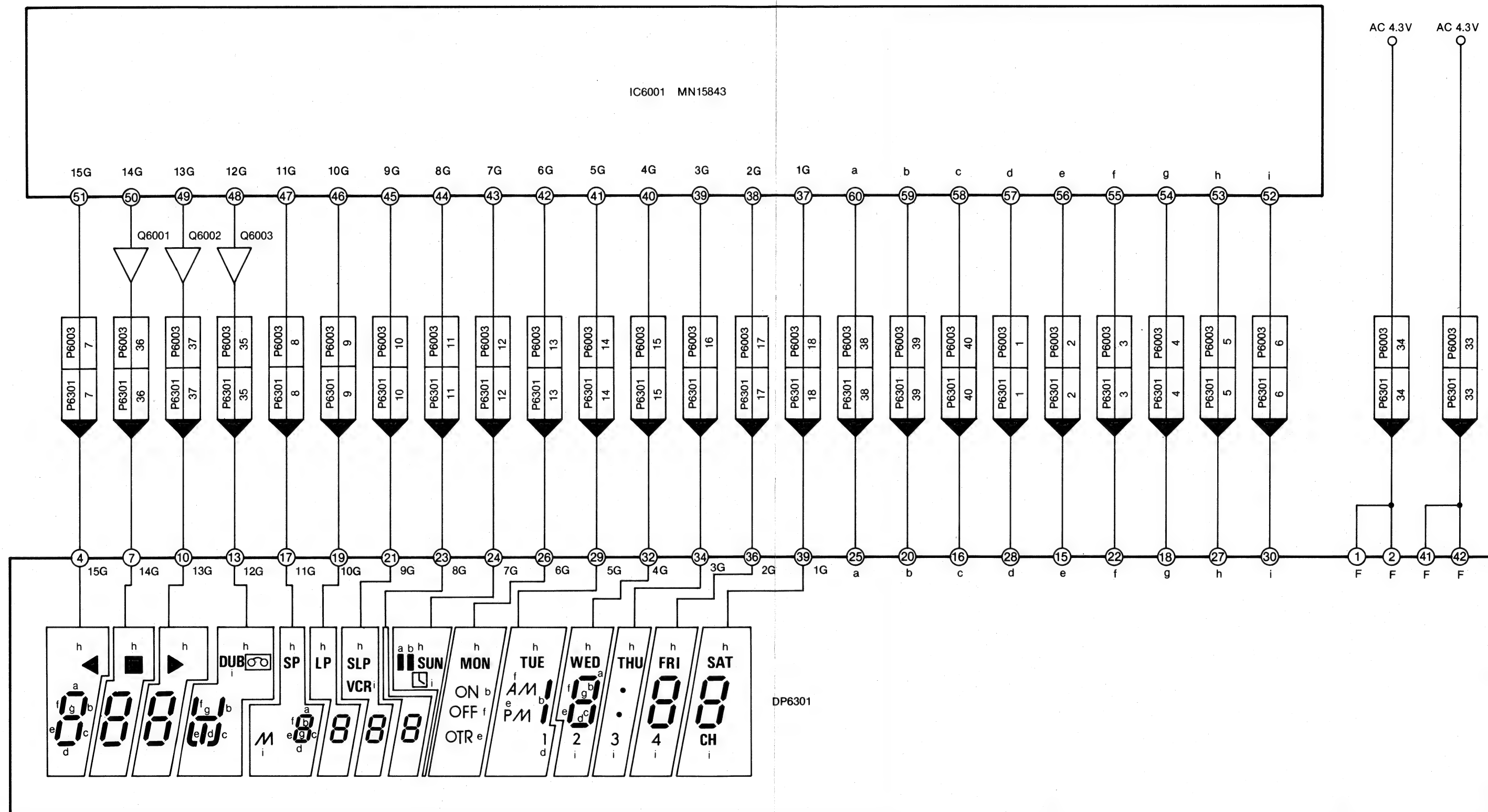
SAFETY FEATURES BLOCK DIAGRAM (SYSTEM CONTROL)



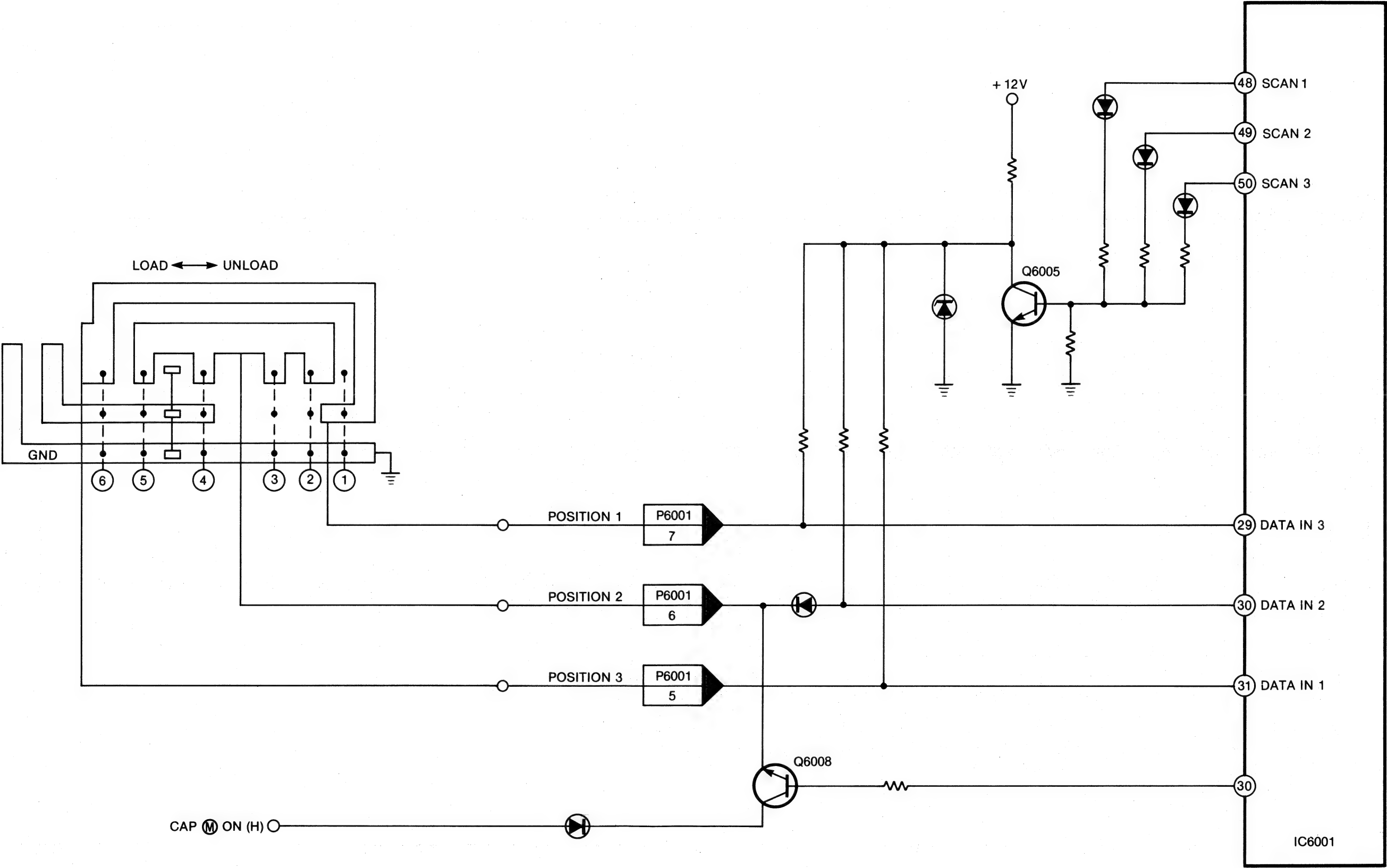
KEY MATRIX BLOCK DIAGRAM (SYSTEM CONTROL)



FIP DRIVE BLOCK DIAGRAM (SYSTEM CONTROL)



MODE SELECT SWITCH BLOCK DIAGRAM (SYSTEM CONTROL)



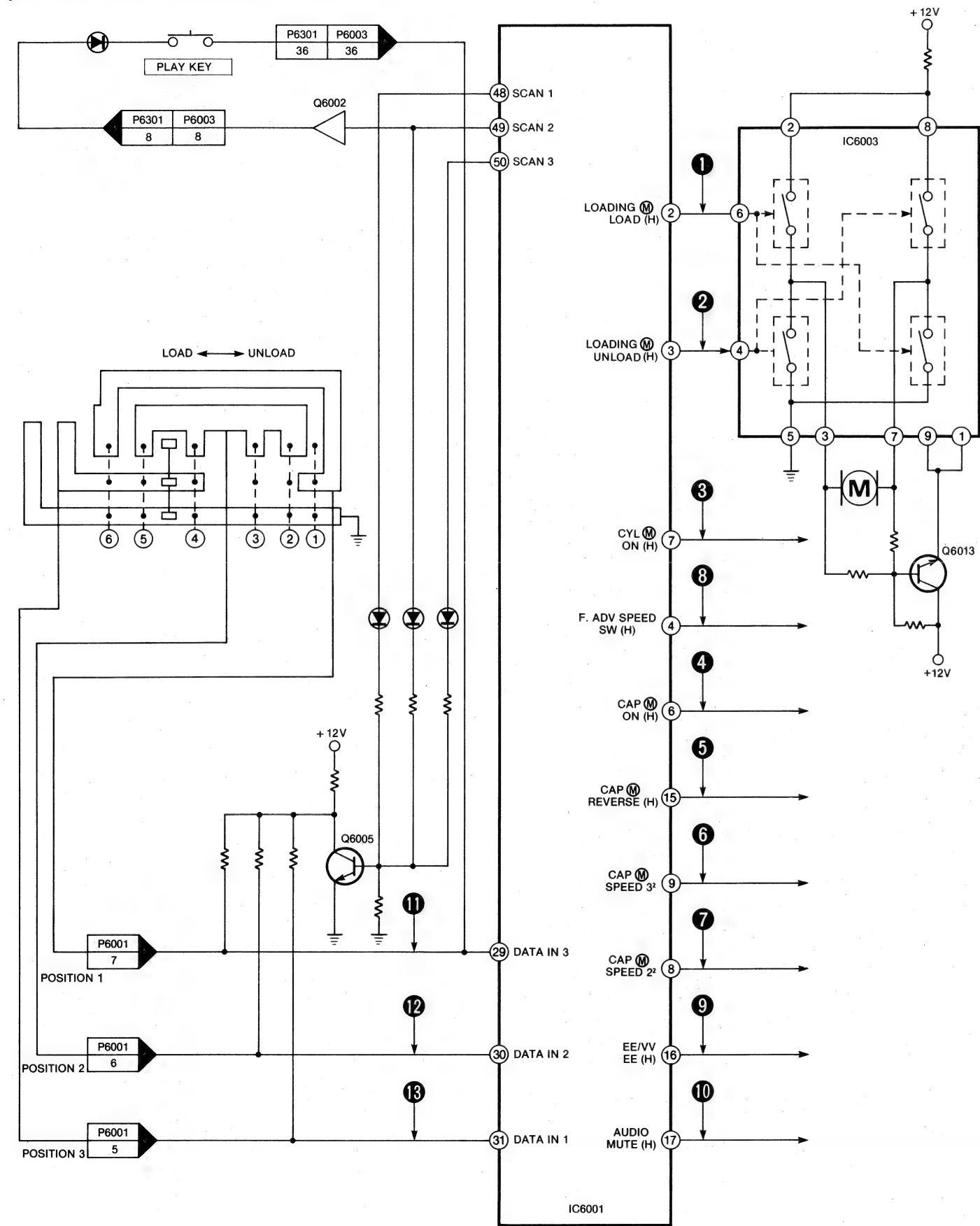
MICROPROCESSOR (IC6001: MN15843VRA) I/O CHART

PIN	I/O	NAME/OPERATION	
1	—	GND	
2	OUTPUT	LOADING (M) FORWARD (H)	
3	OUTPUT	LOADING (M) REVERSE (H)	
4	OUTPUT	FRAME ADVANCE SPEED SWITCH (H)	
5	OUTPUT	SPEED MEMORY (L)	
6	OUTPUT	CAPSTAN (M) ON (H)	
7	OUTPUT	CYLINDER ON (H)	
8	OUTPUT	2 ² (CAPSTAN (M) SPEED) (H)	
9	OUTPUT	3 ² (CAPSTAN (M) SPEED) (H)	
10	INPUT	SYNC SIGNAL	
11	INPUT	RESET	
12	INPUT	INTERRUPT REQUEST	
13	OUTPUT	CHANNEL LOCK	
14	OUTPUT	TV/VCR (TV (H))	
15	OUTPUT	CAPSTAN (M) REVERSE (H)	
16	OUTPUT	EE/VV (EE (H))	
17	OUTPUT	AUDIO MUTE (H)	
18	OUTPUT	SENSOR LED	
19	INPUT	REF VOLTAGE 1	
20	INPUT	DATA IN 10 (DEW SENSOR, TAKE-UP SENSOR)	
21	INPUT	DATA IN 9 (SUPPLY SENSOR, REMOTE PAUSE)	
22	INPUT	DATA IN 8 (SENSOR LED, CYL LOCK)	
23	INPUT	4 MODE REMOTE	
24	INPUT	SYSCON +5V	
25	INPUT	DATA IN 7	
		SCAN PULSE	OPERATION
		SCAN 1	TV/VCR KEY
		SCAN 2	FF KEY
26	INPUT	DATA IN 6	
		SCAN PULSE	OPERATION
		SCAN 1	TIMER SELECT KEY
		SCAN 2	REW KEY
27	INPUT	DATA IN 5	
		SCAN PULSE	OPERATION
		SCAN 1	MODE KEY
		SCAN 2	EJECT KEY
28	INPUT	DATA IN 4	
		SCAN PULSE	OPERATION
		SCAN 1	TIMER SET KEY
		SCAN 2	STOP KEY
		SCAN 3	POWER ON/OFF KEY

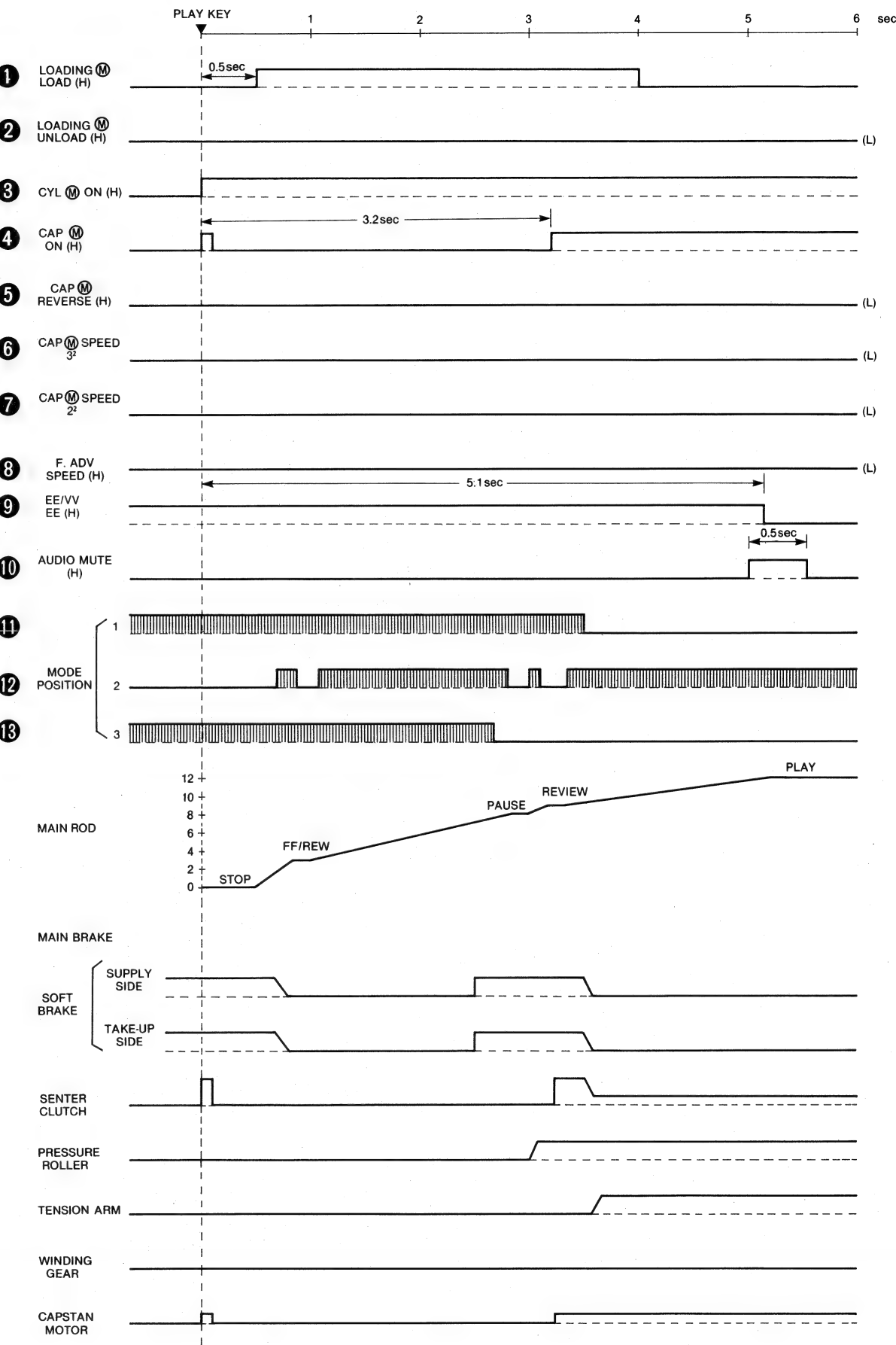
(SYSTEM CONTROL)

PIN	I/O	NAME/OPERATION	
29	INPUT	DATA IN 3	
		SCAN PULSE	OPERATION
		SCAN 1	O.T.R KEY
		SCAN 2	PLAY KEY
30	INPUT	DATA IN 2	
		SCAN PULSE	OPERATION
		SCAN 1	F. ADV KEY
		SCAN 2	REC KEY
31	INPUT	DATA IN 1	
		SCAN PULSE	OPERATION
		SCAN 1	TIMER ON/OFF KEY
		SCAN 2	PAUSE KEY
32	OUTPUT	REEL SENSOR	
33	OUTPUT	POWER ON (L)	
34	OUTPUT	EXCEPT PLAY (H)	
35	OUTPUT	CUE/REVIEW/SLOW/STILL (H)	
36	OUTPUT	DELAY REC (L)	
37	OUTPUT	GRID E	
38	OUTPUT	GRID D	
39	OUTPUT	GRID C	
40	OUTPUT	GRID B	
41	OUTPUT	GRID A	
42	OUTPUT	GRID 9	
43	OUTPUT	GRID 8	
44	OUTPUT	GRID 7	
45	OUTPUT	GRID 6	
46	OUTPUT	GRID 5	
47	OUTPUT	GRID 4	
48	OUTPUT	GRID 3	
49	OUTPUT	GRID 2	
50	OUTPUT	GRID 1	
51	OUTPUT	GRID 0	
52	OUTPUT	SEGMENT 8	
53	OUTPUT	SEGMENT 7	
54	OUTPUT	SEGMENT 6	
55	OUTPUT	SEGMENT 5	
56	OUTPUT	SEGMENT 4	
57	OUTPUT	SEGMENT 3	
58	OUTPUT	SEGMENT 2	
59	OUTPUT	SEGMENT 1	
60	OUTPUT	SEGMENT 0	
61	INPUT	Vpp	
62	INPUT	OSC 2	
63	INPUT	OSC 1	
64	INPUT	Vdd	

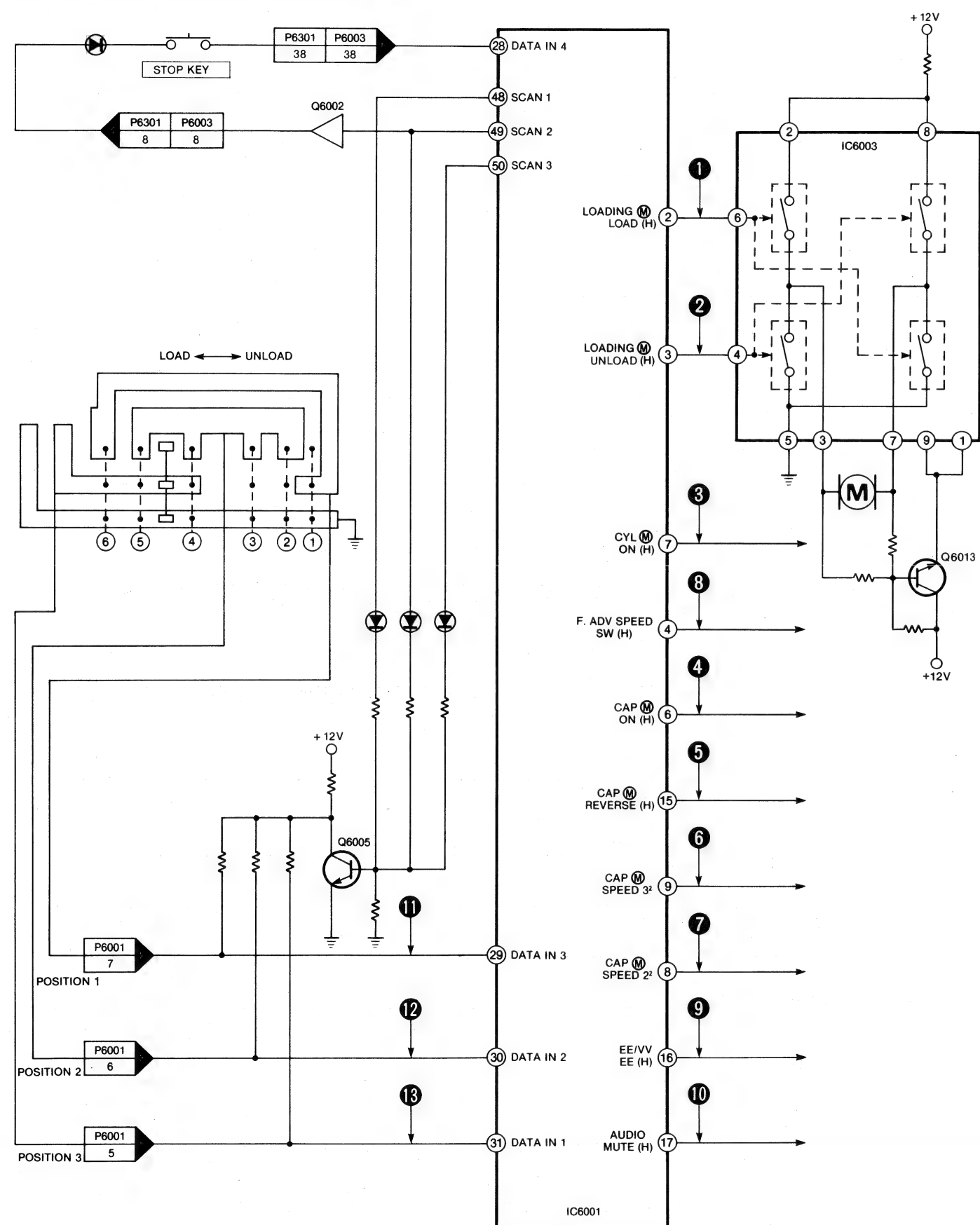
**STOP → PLAY MODE BLOCK DIAGRAM
(SYSTEM CONTROL)**



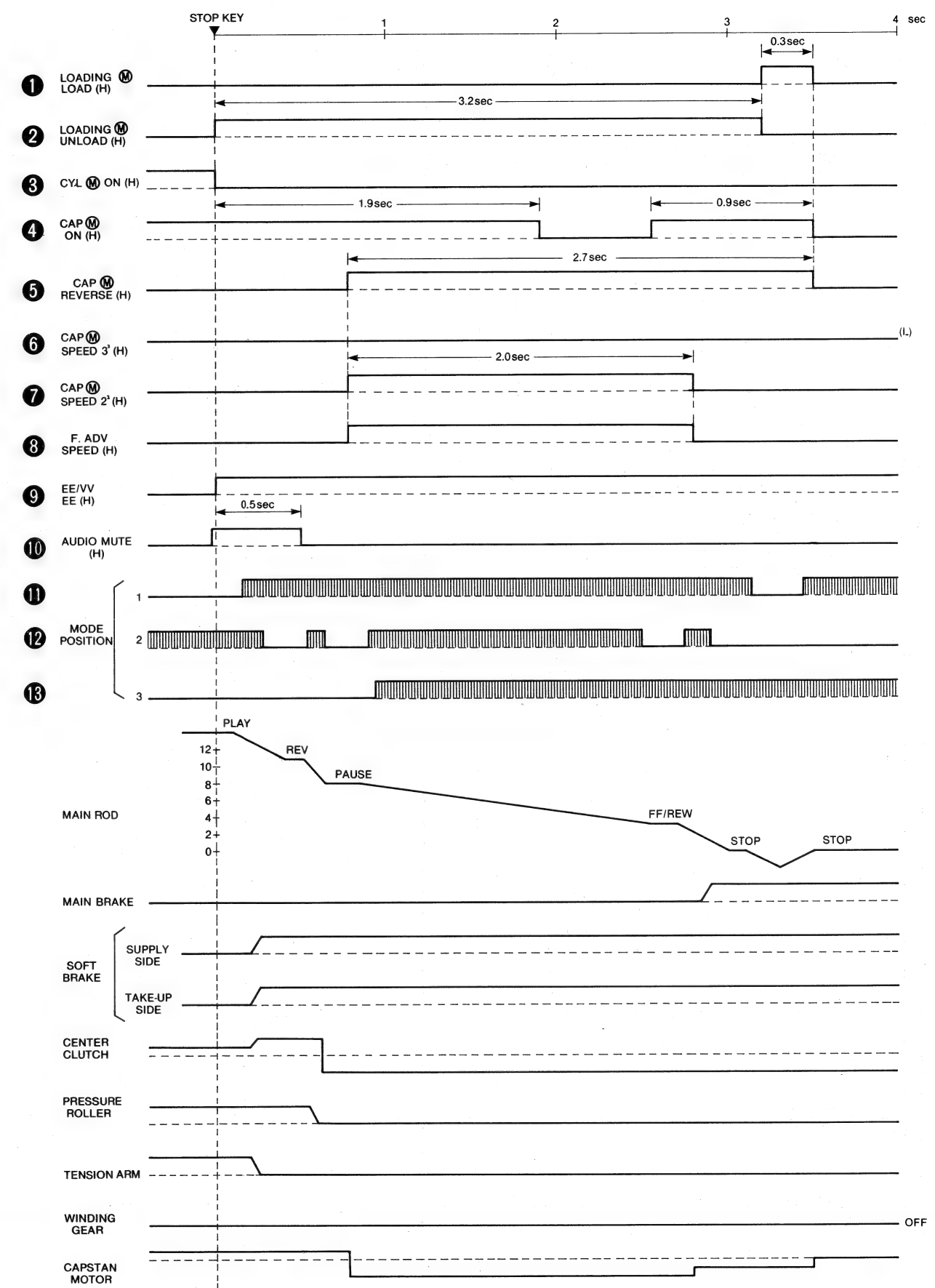
STOP → PLAY MODE TIMING CHART



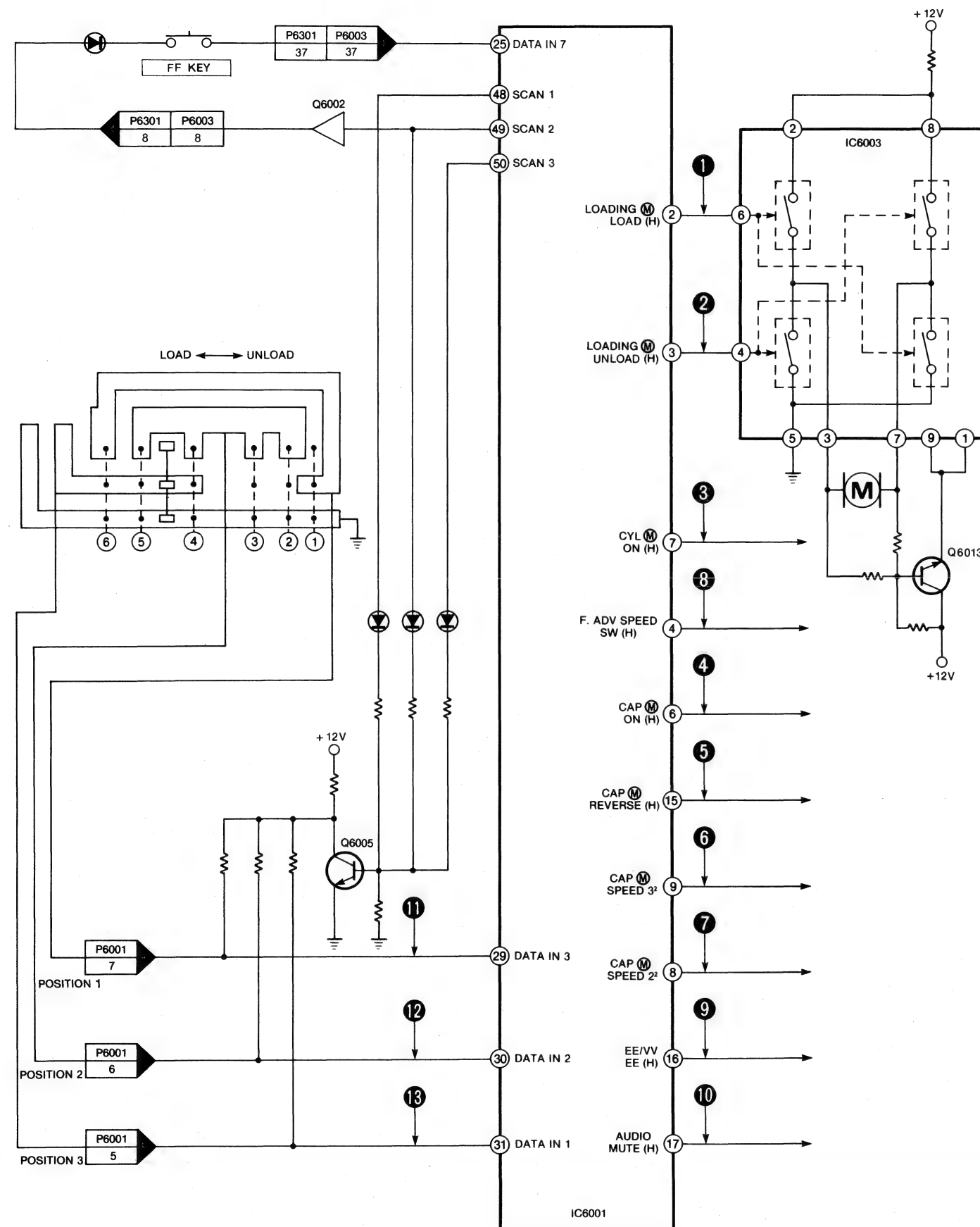
PLAY → STOP MODE BLOCK DIAGRAM (SYSTEM CONTROL)



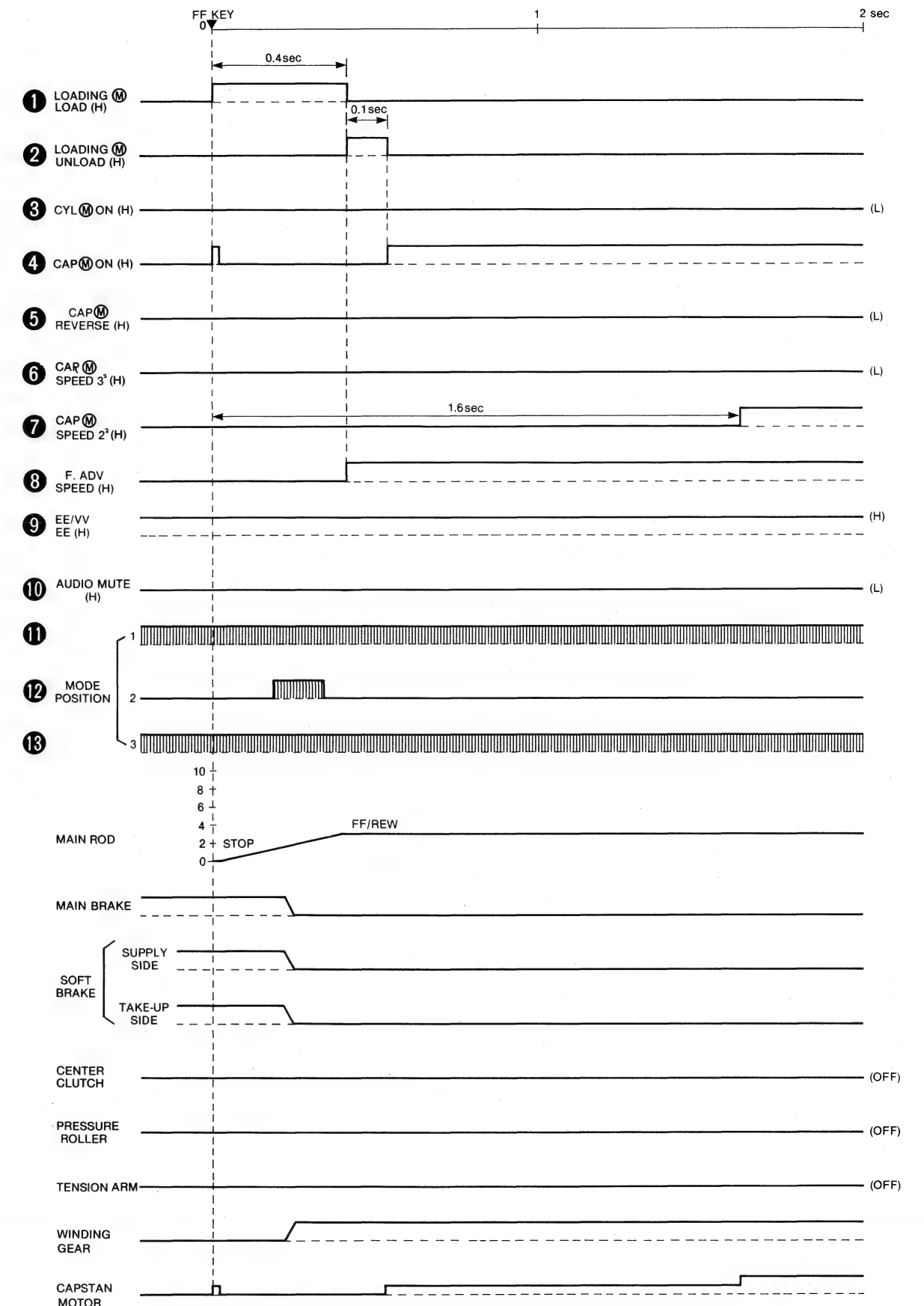
PLAY → STOP MODE TIMING CHART



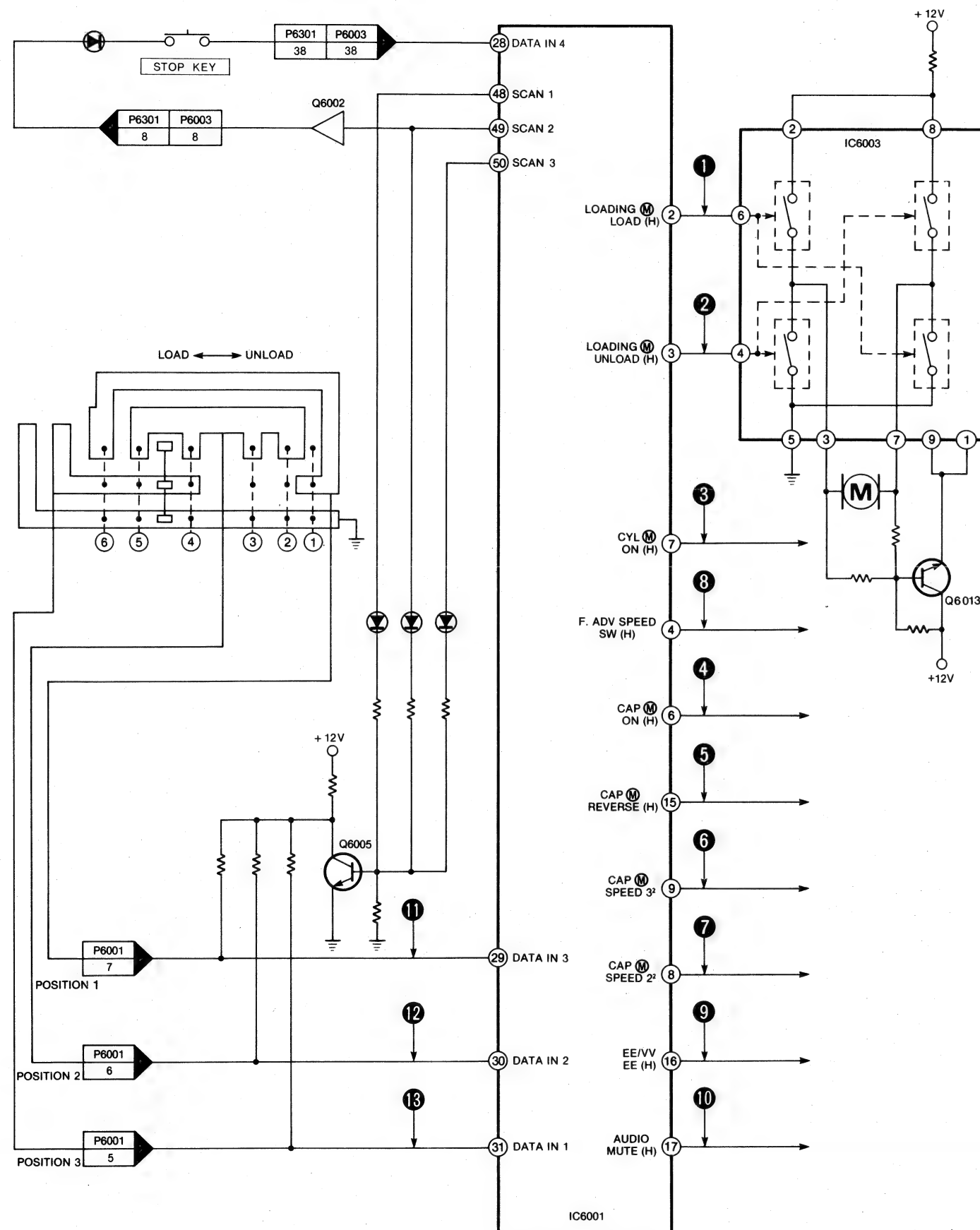
STOP → FF MODE BLOCK DIAGRAM (SYSTEM CONTROL)



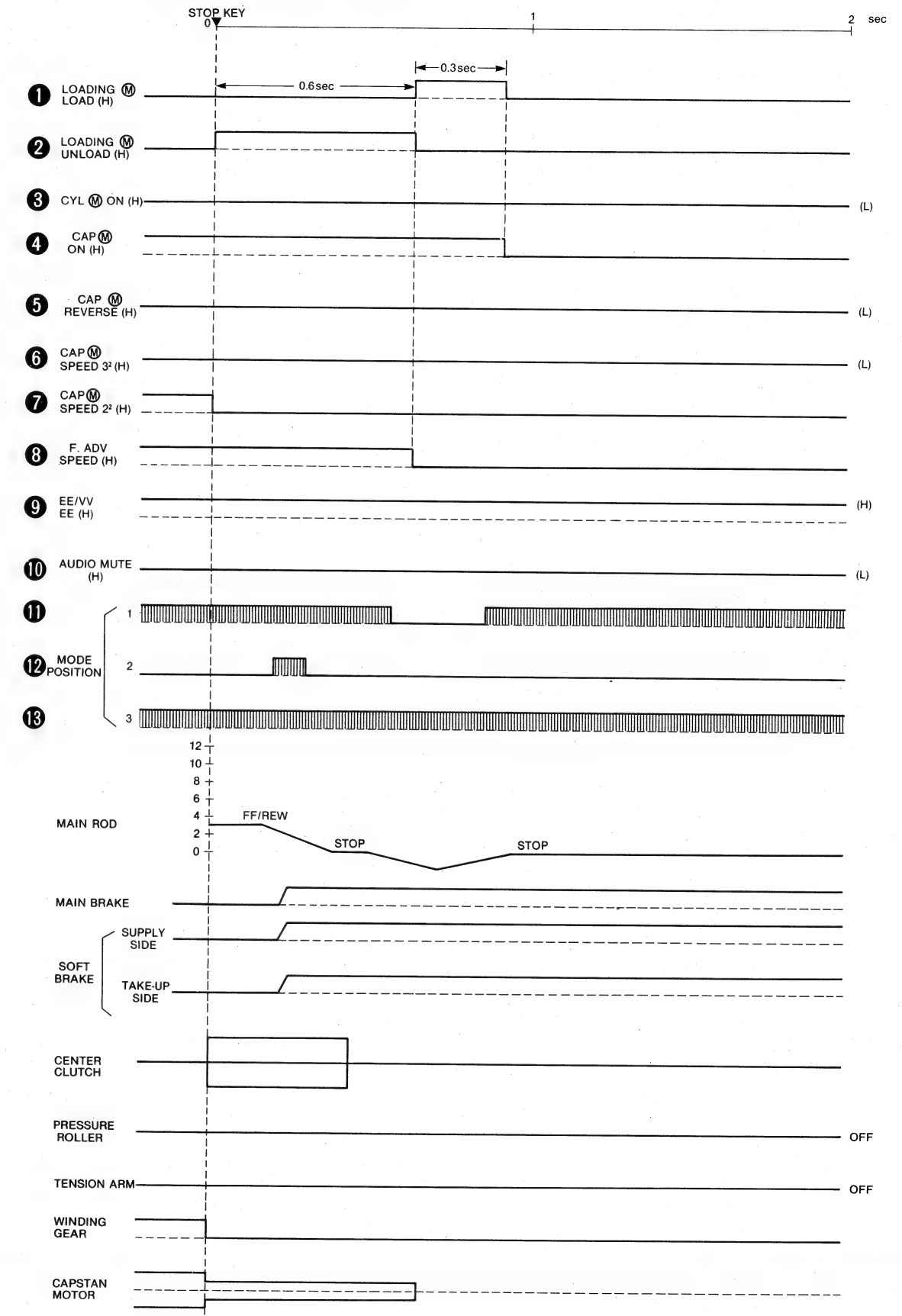
STOP → FF MODE TIMING CHART



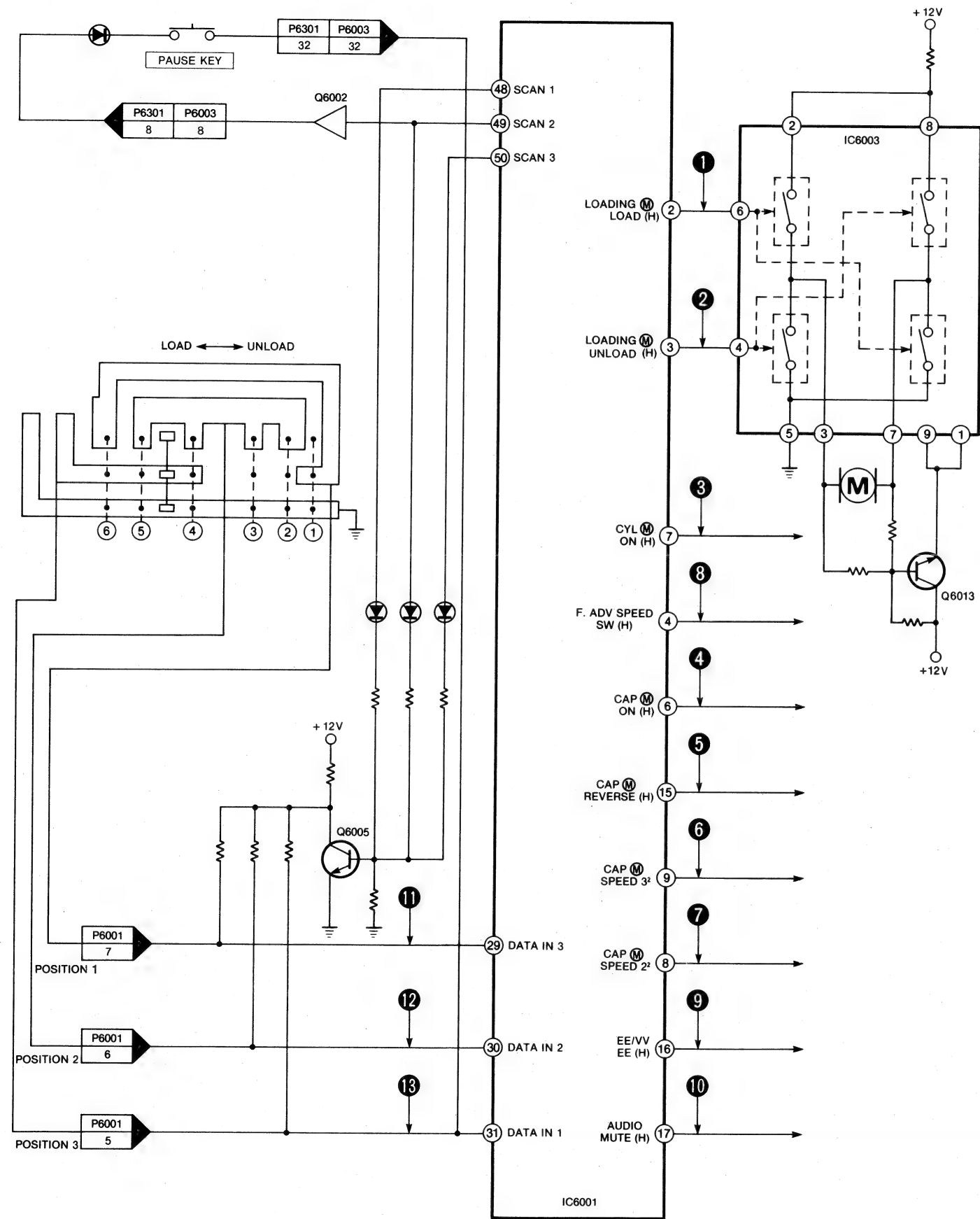
FF → STOP MODE BLOCK DIAGRAM (SYSTEM CONTROL)



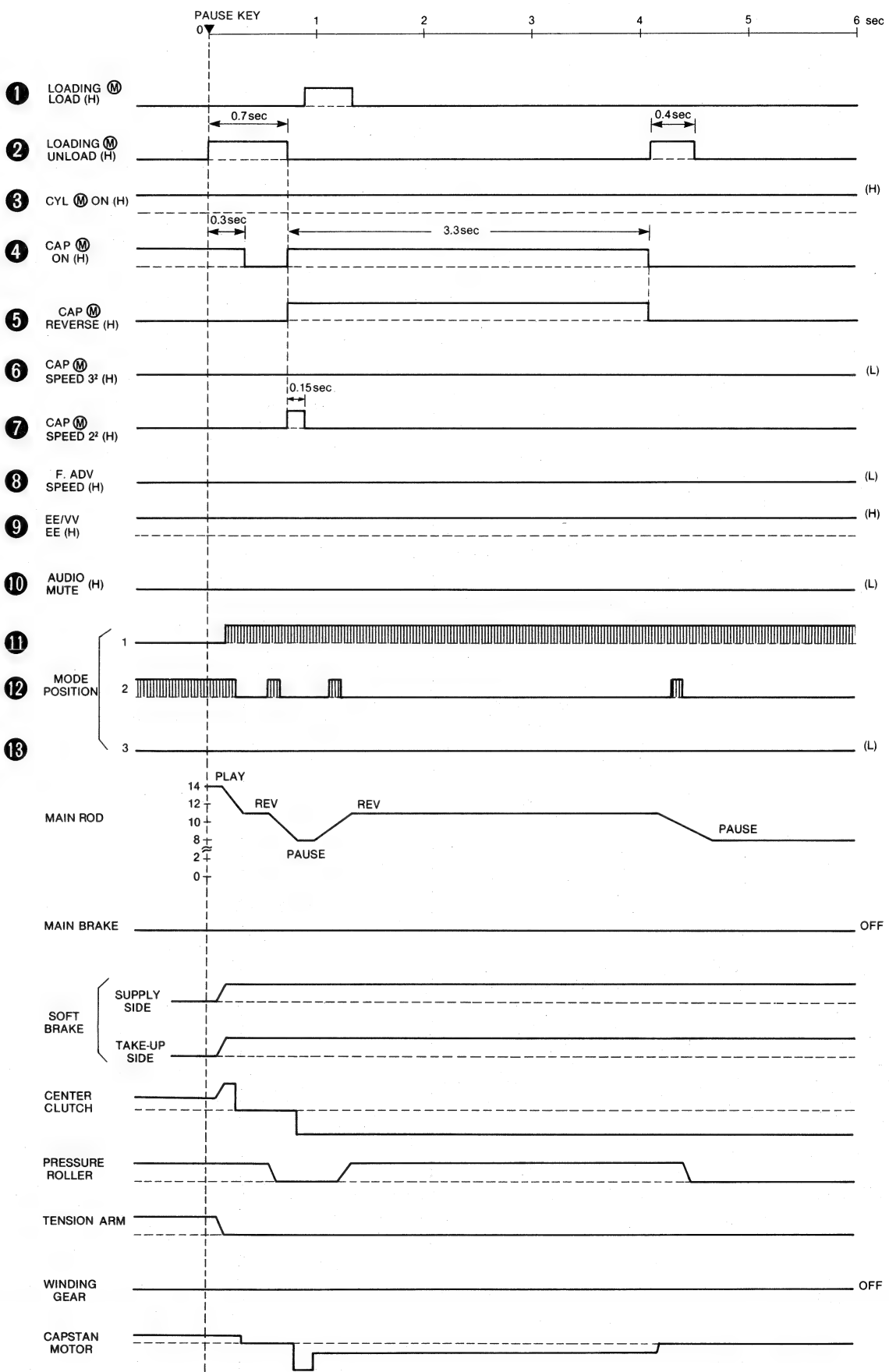
FF → STOP MODE TIMING CHART



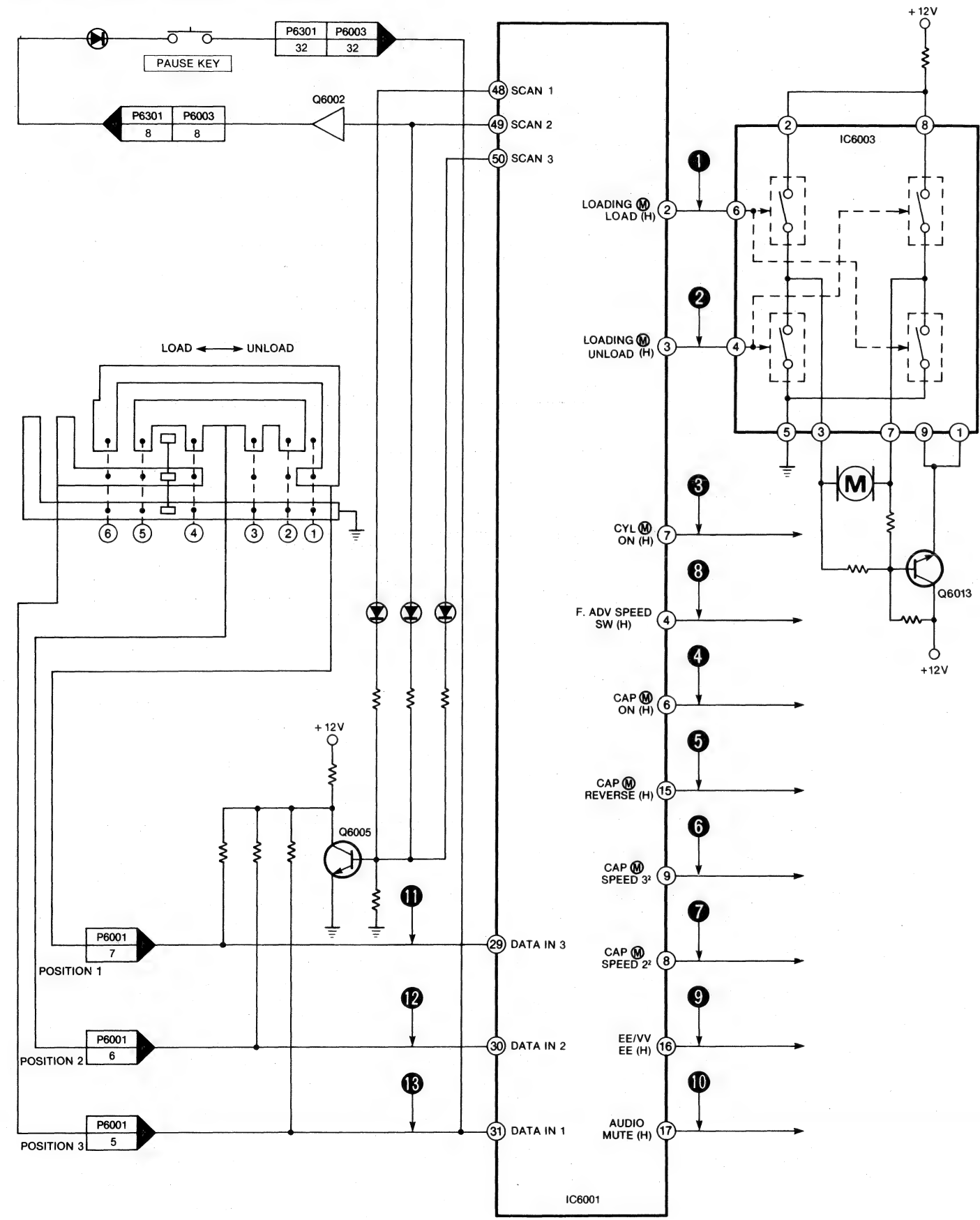
REC • PLAY → REC • PAUSE MODE BLOCK DIAGRAM
(SYSTEM CONTROL)



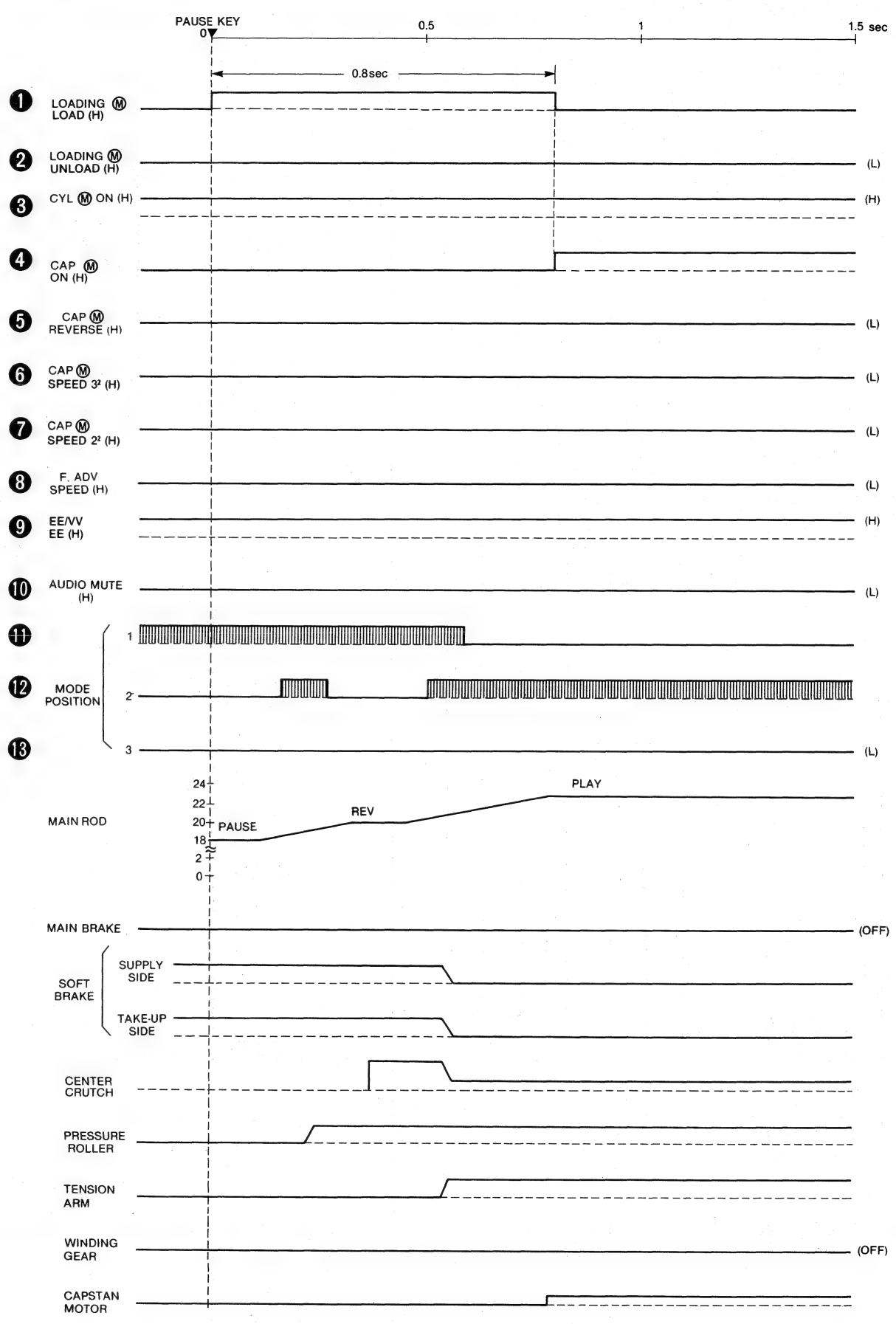
REC • PLAY → REC • PAUSE MODE TIMING CHART



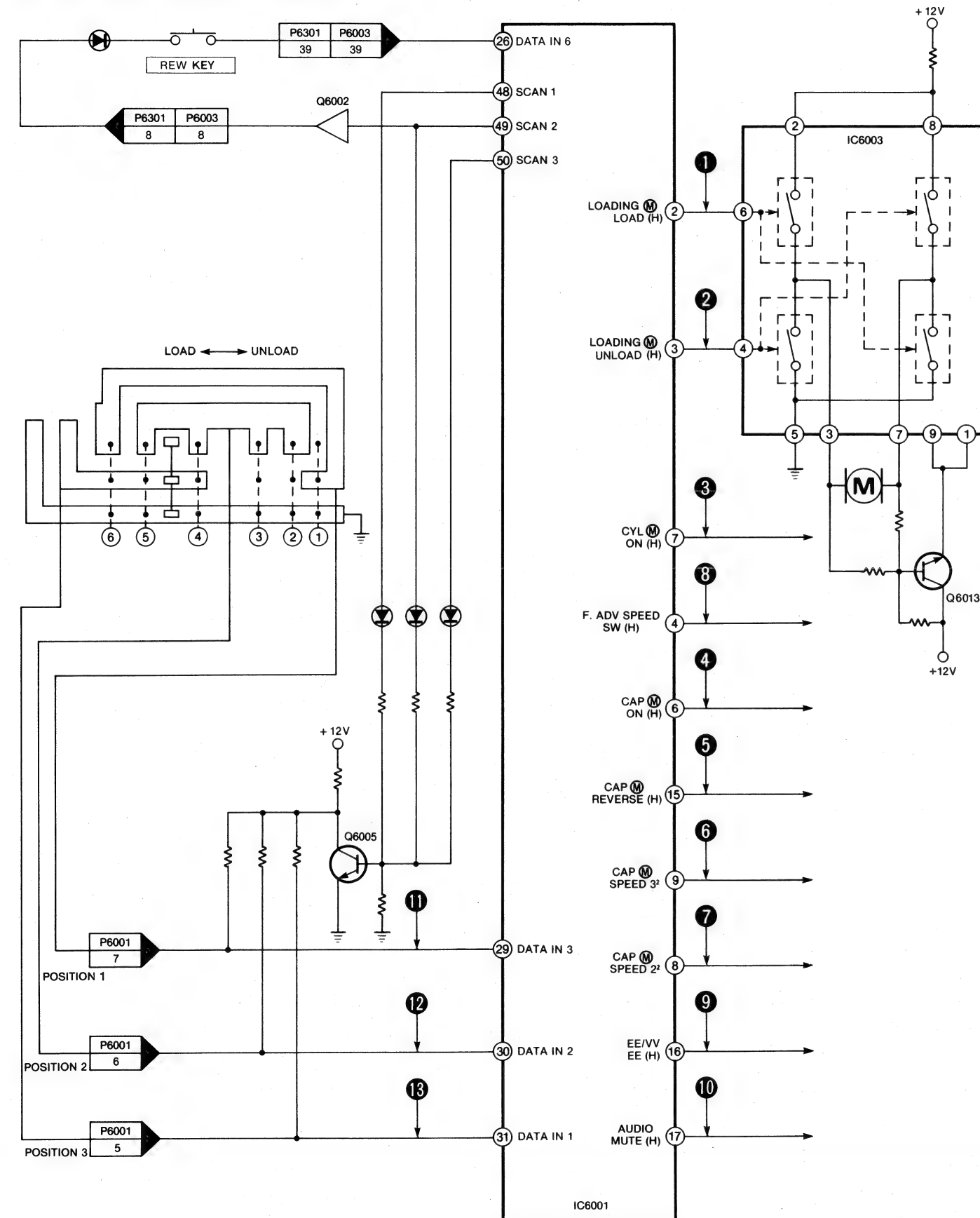
REC • PAUSE → REC • PLAY MODE BLOCK DIAGRAM (SYSTEM CONTROL)



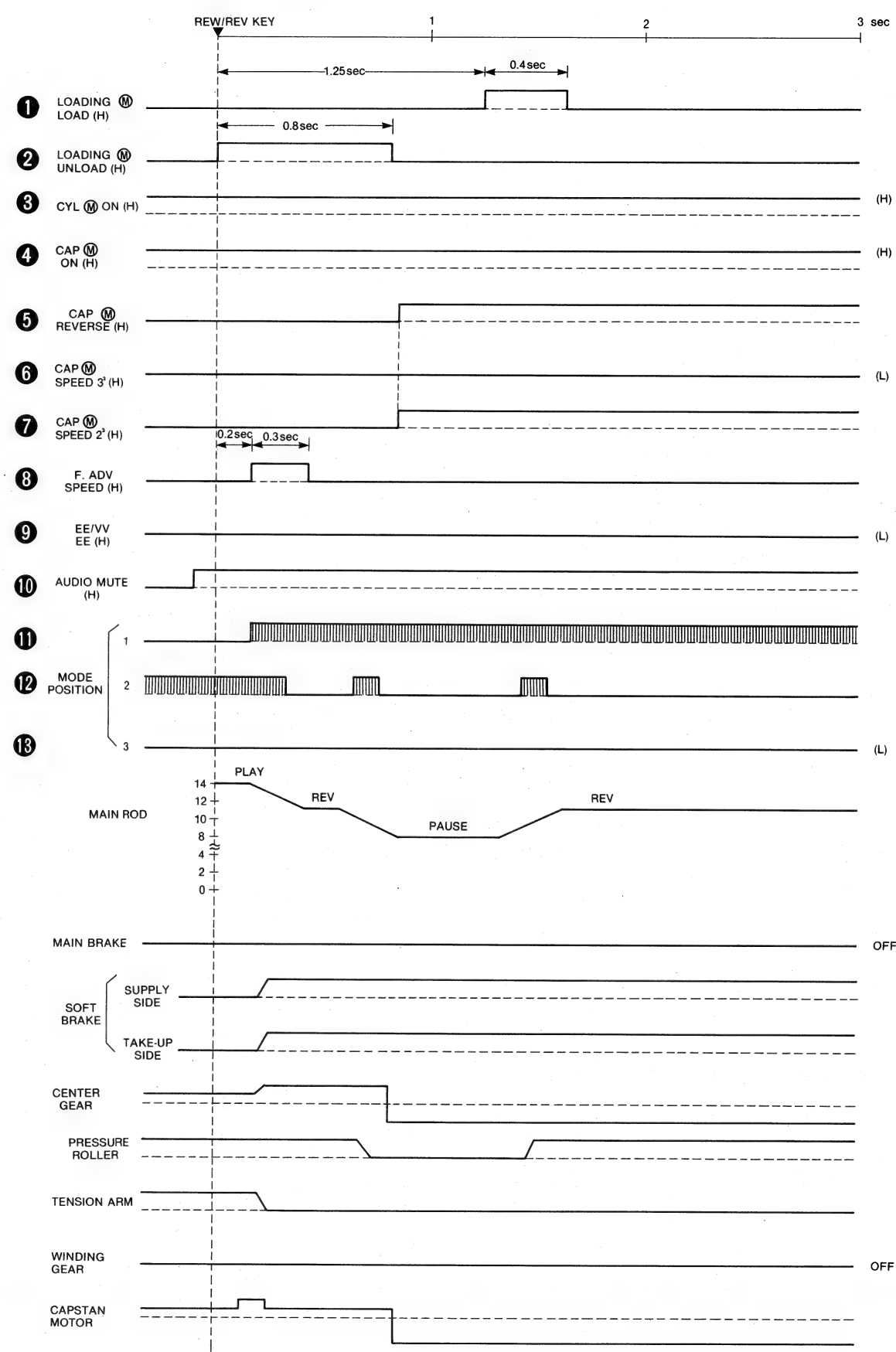
REC • PAUSE → REC • PLAY MODE TIMING CHART



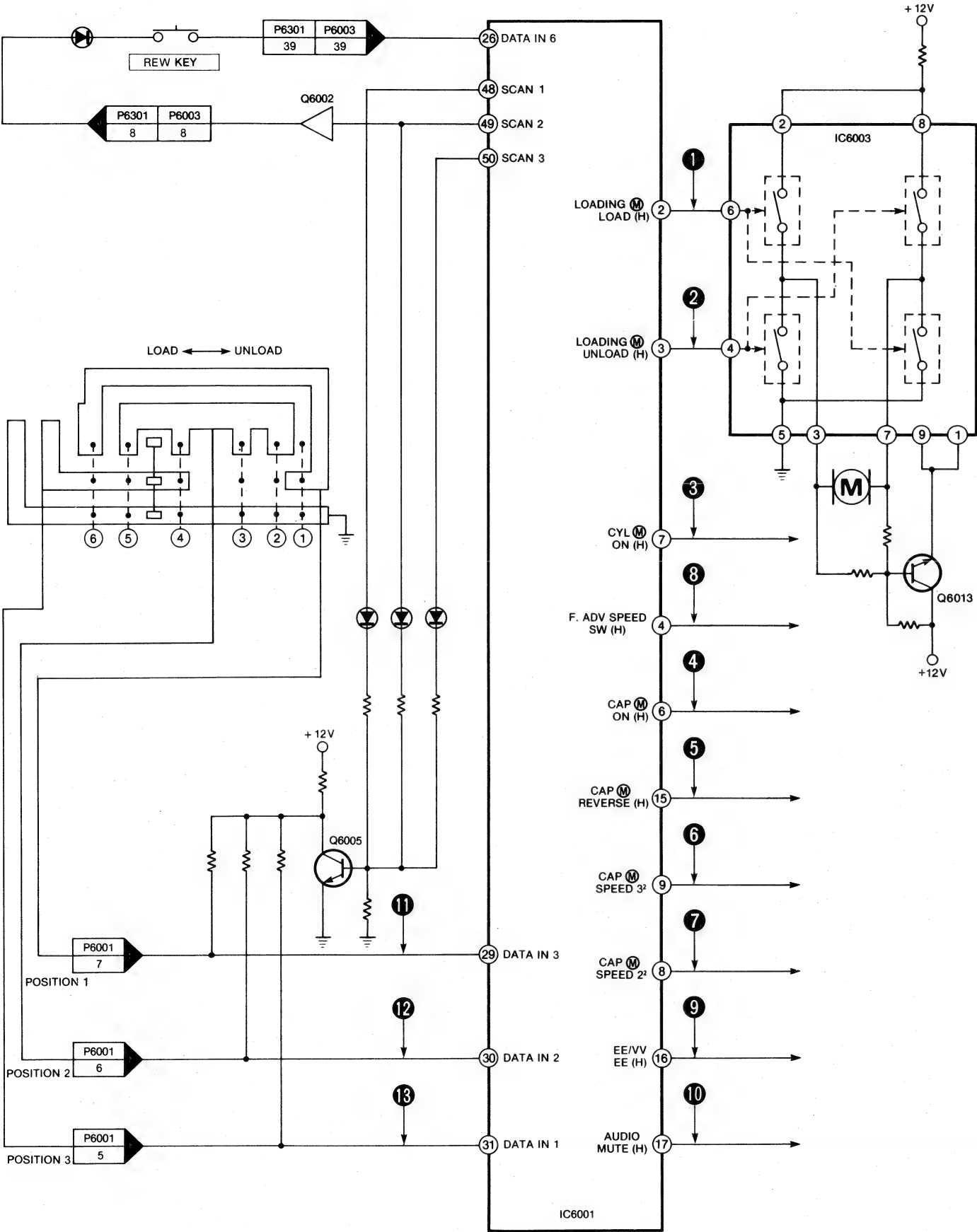
**PLAY → REVIEW MODE BLOCK DIAGRAM
(SYSTEM CONTROL)**



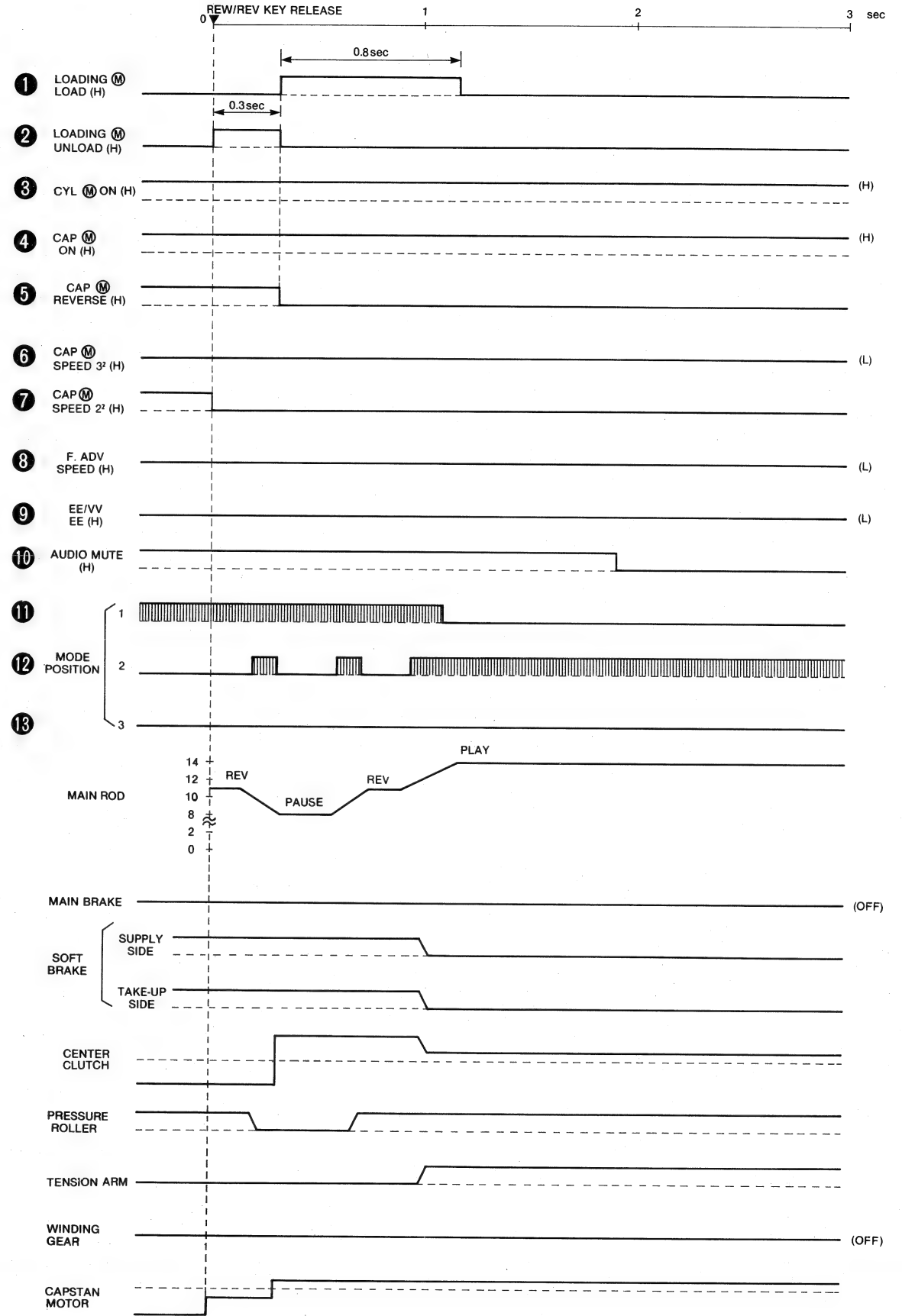
PLAY → REVIEW MODE TIMING CHART



REVIEW → PLAY MODE BLOCK DIAGRAM (SYSTEM CONTROL)



REVIEW → PLAY MODE TIMING CHART



The diagram illustrates the electrical control system for a vehicle, featuring a 12V power source, a fuse, and a switch labeled "F.ADV/SLOW KEY". The system is divided into three main sections: a top section for input controls, a middle section for a multi-position selector switch, and a bottom section for output relays and actuators.

Top Section (Input Controls):

- A 12V power source is connected to a fuse and a switch labeled "F.ADV/SLOW KEY".
- The switch is connected to a relay assembly containing P6301 (34) and P6003 (34).
- The relay assembly is connected to a transistor Q6001.
- Q6001 is connected to a multi-position switch (POSITION 1, 2, 3) and a relay assembly containing P6001 (7) and P6003 (10).

Middle Section (Multi-Position Selector Switch):

- The multi-position switch (POSITION 1, 2, 3) is connected to a relay assembly containing P6001 (7) and P6003 (10).
- The relay assembly is connected to a transistor Q6005.
- Q6005 is connected to a multi-position switch (POSITION 1, 2, 3) and a relay assembly containing P6001 (7) and P6003 (10).

Bottom Section (Output Relays and Actuators):

- The multi-position switch (POSITION 1, 2, 3) is connected to a relay assembly containing P6001 (7) and P6003 (10).
- The relay assembly is connected to a transistor Q6005.
- Q6005 is connected to a multi-position switch (POSITION 1, 2, 3) and a relay assembly containing P6001 (7) and P6003 (10).

Relay Assembly Details:

- IC6003:** A detailed view of a relay assembly showing its internal contacts and connections. It includes a multi-position switch (POSITION 1, 2, 3) and a relay assembly containing P6001 (7) and P6003 (10).
- IC6001:** A detailed view of a relay assembly showing its internal contacts and connections. It includes a multi-position switch (POSITION 1, 2, 3) and a relay assembly containing P6001 (7) and P6003 (10).

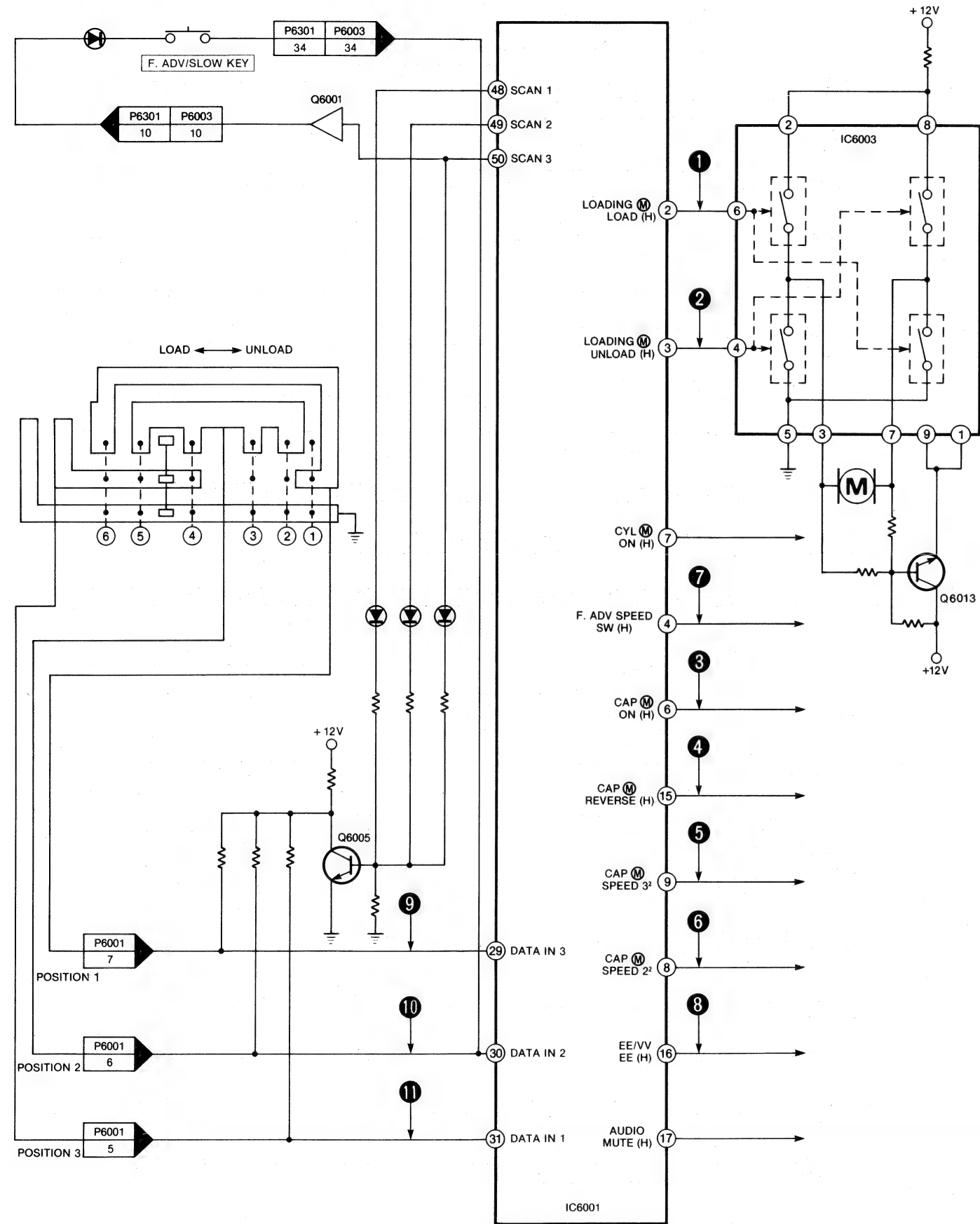
Legend:

- 1: 12V
- 2: FUSE
- 3: F.ADV/SLOW KEY
- 4: P6301 (34)
- 5: P6003 (34)
- 6: Q6001
- 7: P6001 (7)
- 8: P6003 (10)
- 9: Q6005
- 10: P6001 (7)
- 11: P6003 (10)

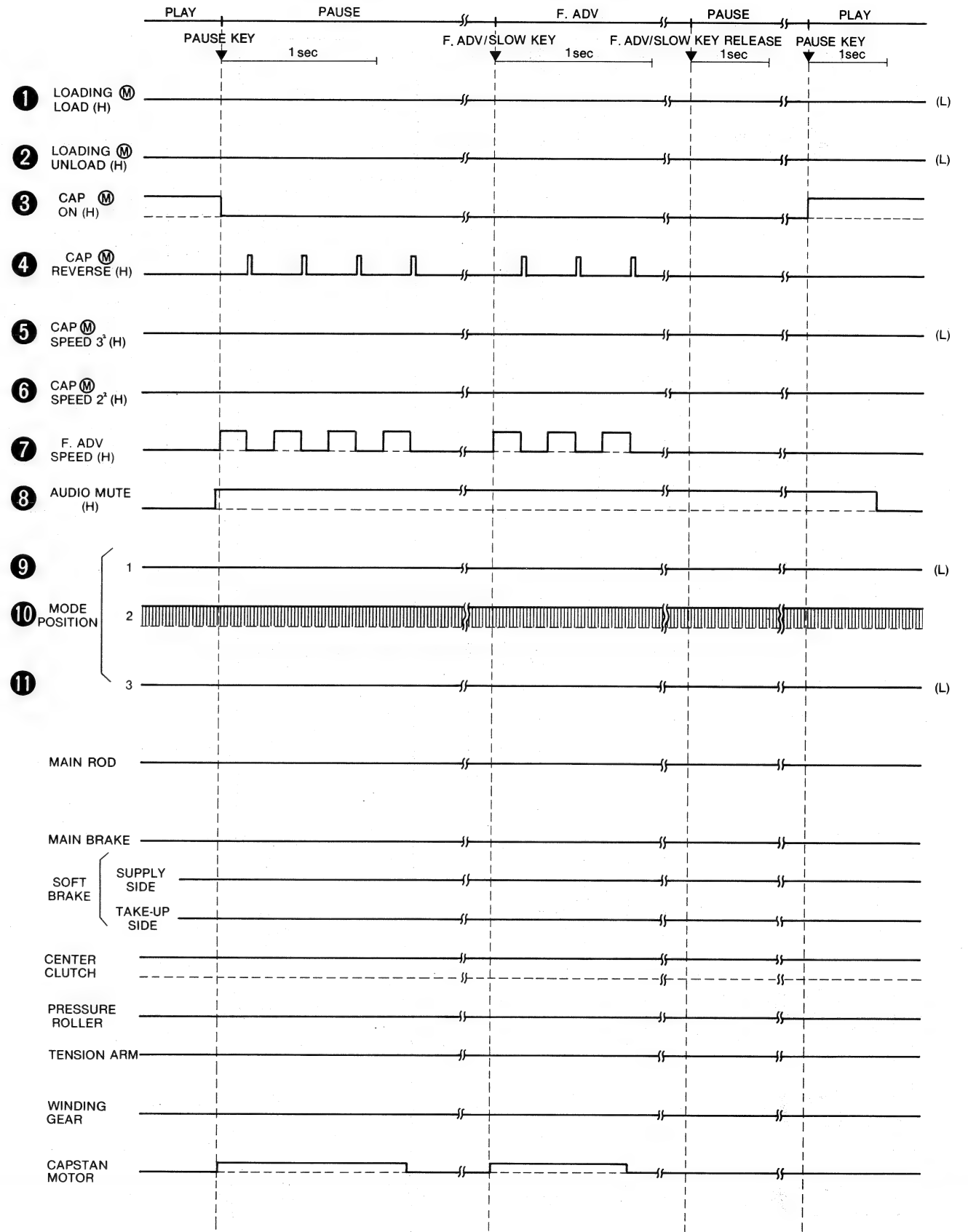
The diagram illustrates the timing sequence for the loading operation. It is divided into three main sections: **PLAY**, **SLOW**, and **PLAY**. The sequence begins at the **F. ADV/SLOW KEY** transition, marked with a **0** and a **1sec** scale bar. The sequence of events is as follows:

- LOADING (M)** and **UNLOAD (H)** occur during the initial **PLAY** phase.
- CAP (M) ON (H)** occurs during the **SLOW** phase.
- CAP (M) REVERSE (H)** occurs during the **SLOW** phase.
- CAP (M) SPEED 3' (H)** occurs during the **SLOW** phase.
- CAP (M) SPEED 2' (H)** occurs during the **SLOW** phase.
- F. ADV SPEED (H)** pulses occur during the **SLOW** phase.
- AUDIO MUTE (H)** occurs during the **SLOW** phase.
- MODE POSITION** (1, 2, 3) occurs during the **SLOW** phase.
- MAIN ROD** occurs during the **SLOW** phase.
- MAIN BRAKE** occurs during the **SLOW** phase.
- SOFT BRAKE** (SUPPLY SIDE, TAKE-UP SIDE) occurs during the **SLOW** phase.
- CENTER CLUTCH** occurs during the **SLOW** phase.
- PRESSURE ROLLER** occurs during the **SLOW** phase.
- TENSION ARM** occurs during the **SLOW** phase.
- WINDING GEAR** occurs during the **SLOW** phase.
- CAPSTAN MOTOR** occurs during the **SLOW** phase.

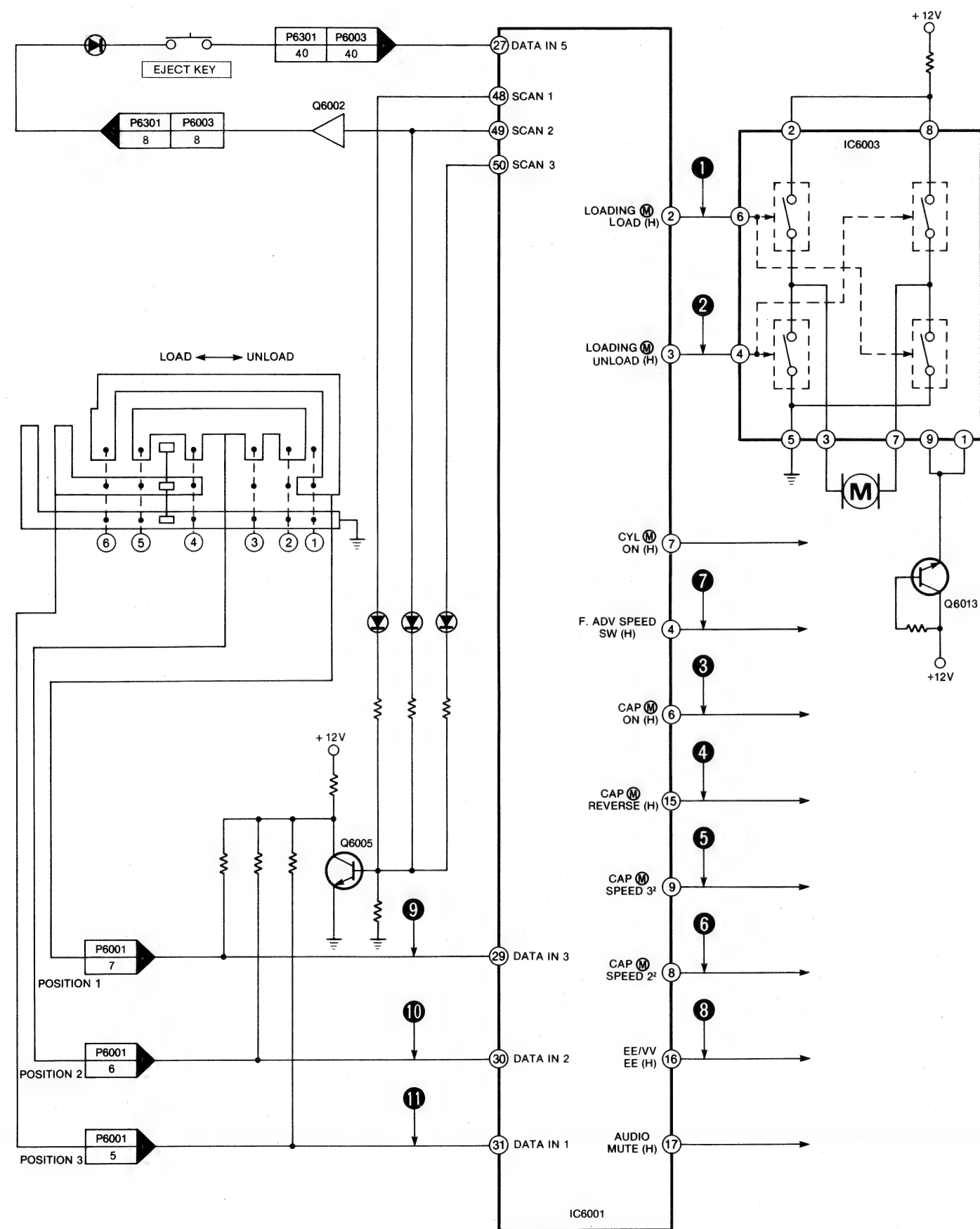
PLAY → F • ADV → PLAY MODE BLOCK DIAGRAM (SYSTEM CONTROL)



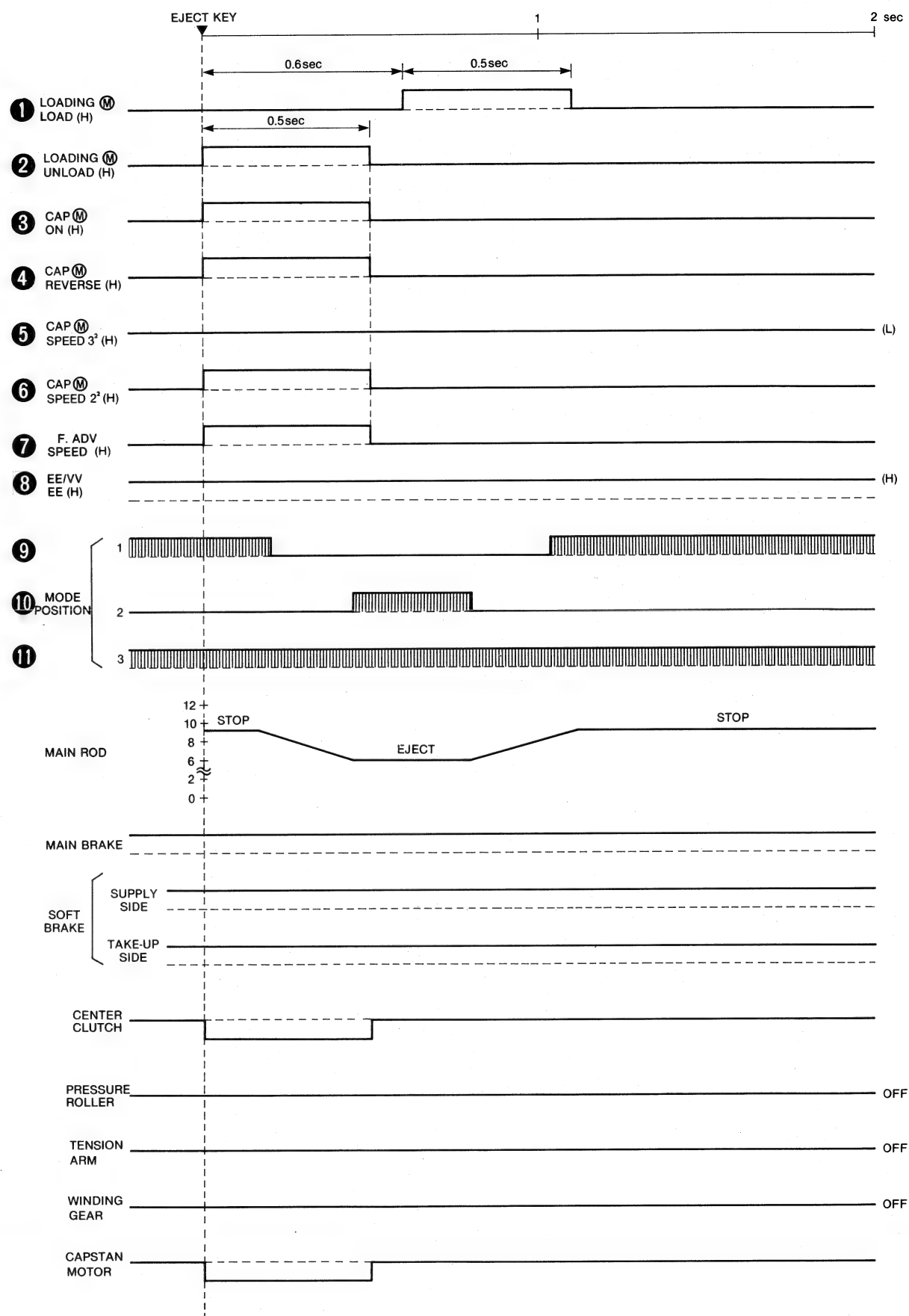
PLAY → F • ADV → PLAY MODE TIMING CHART

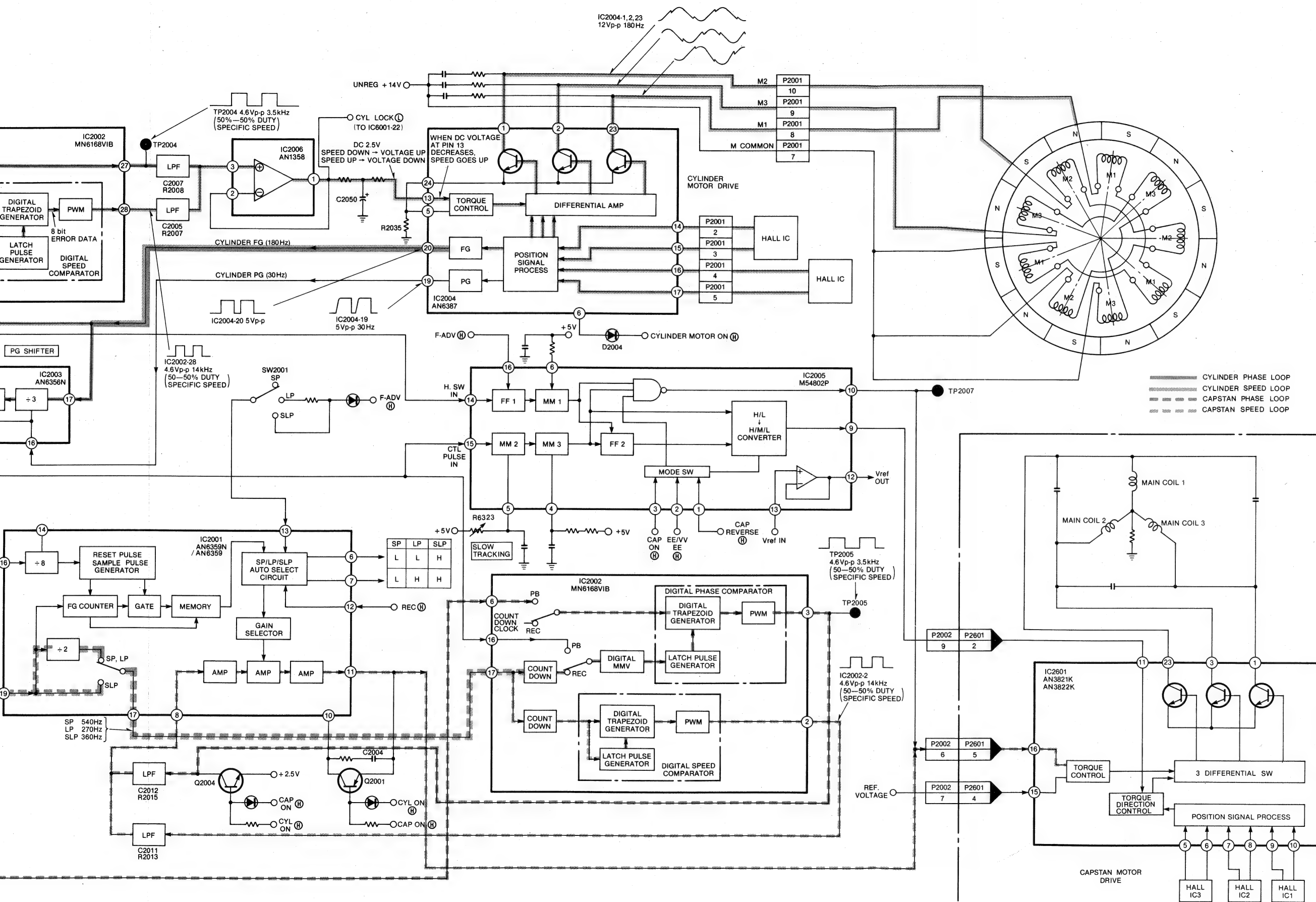


STOP → EJECT MODE BLOCK DIAGRAM
(SYSTEM CONTROL)

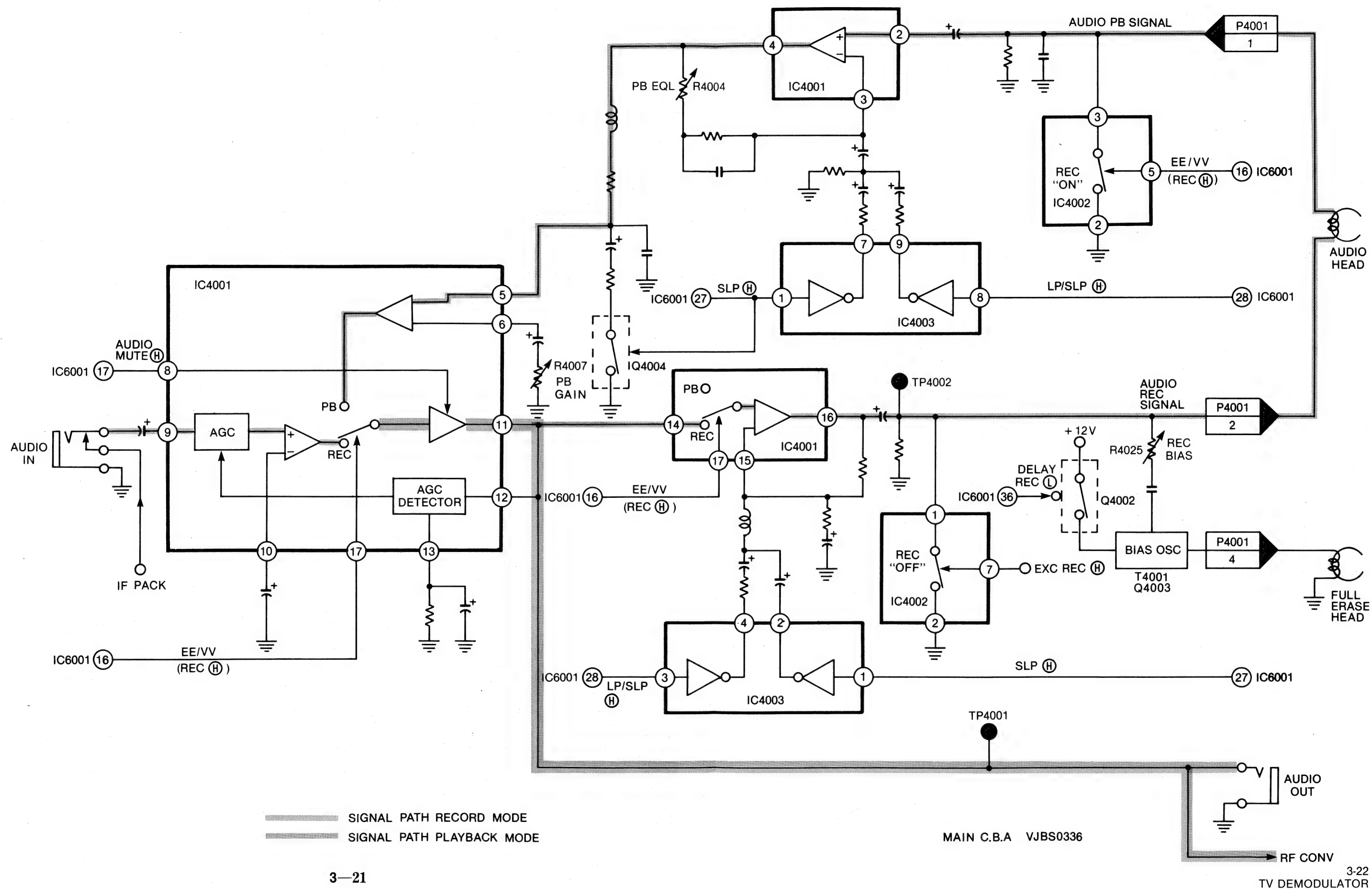


STOP → EJECT MODE TIMING CHART

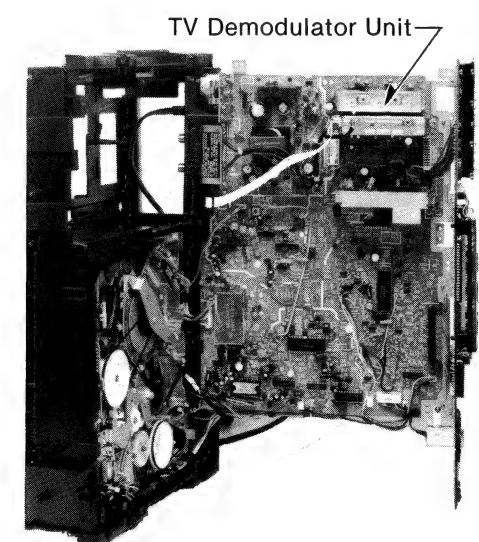
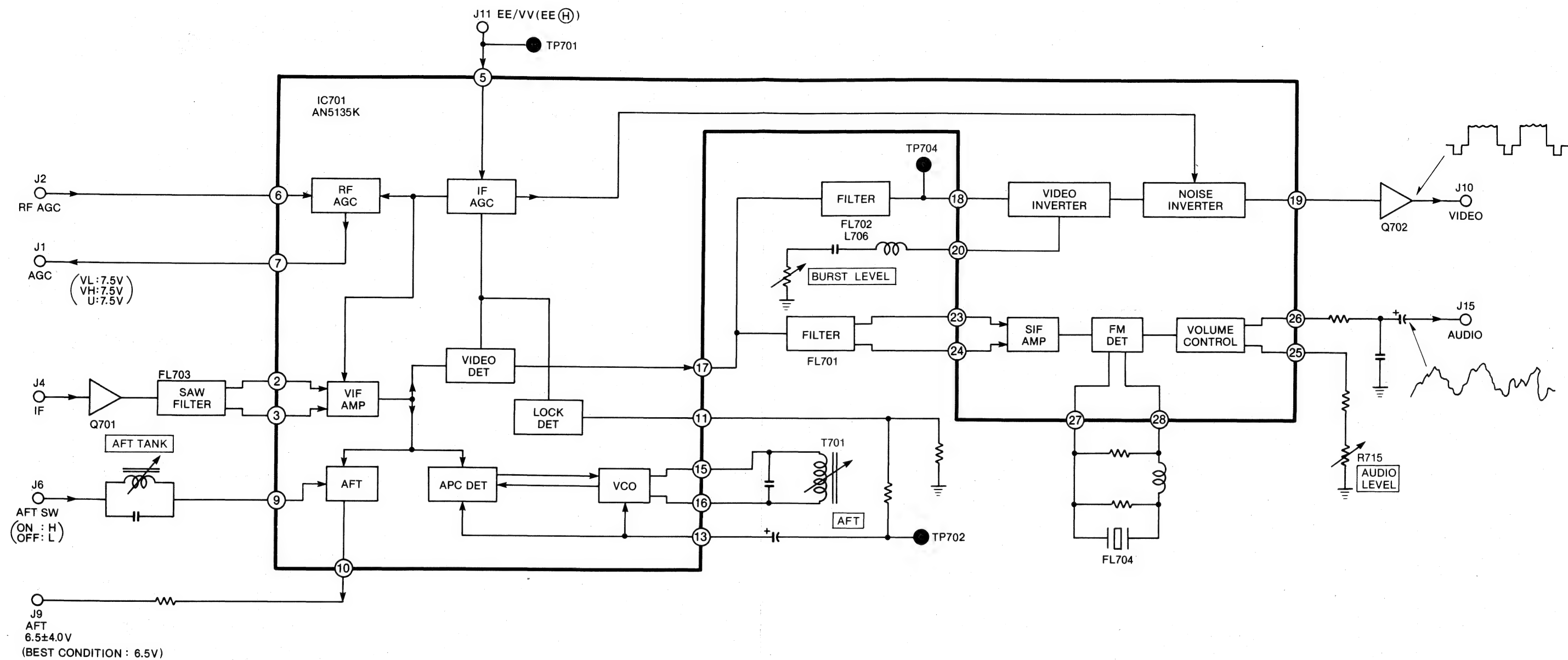




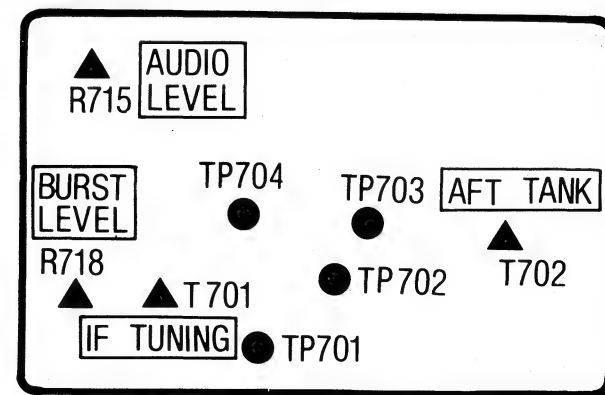
AUDIO BLOCK DIAGRAM



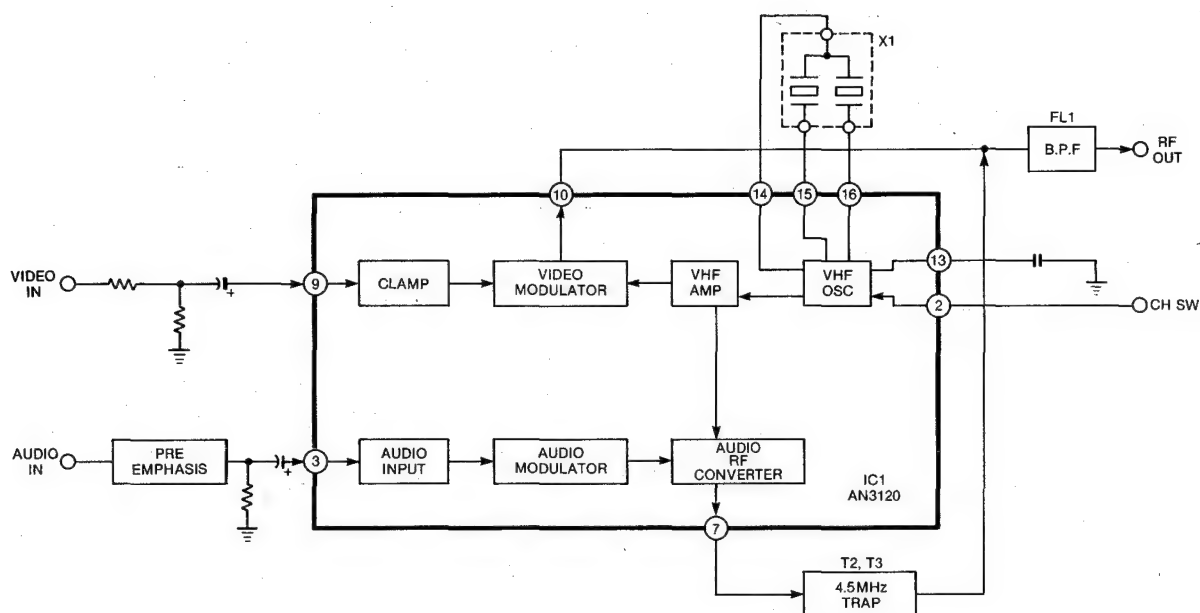
TV DEMODULATOR BLOCK DIAGRAM



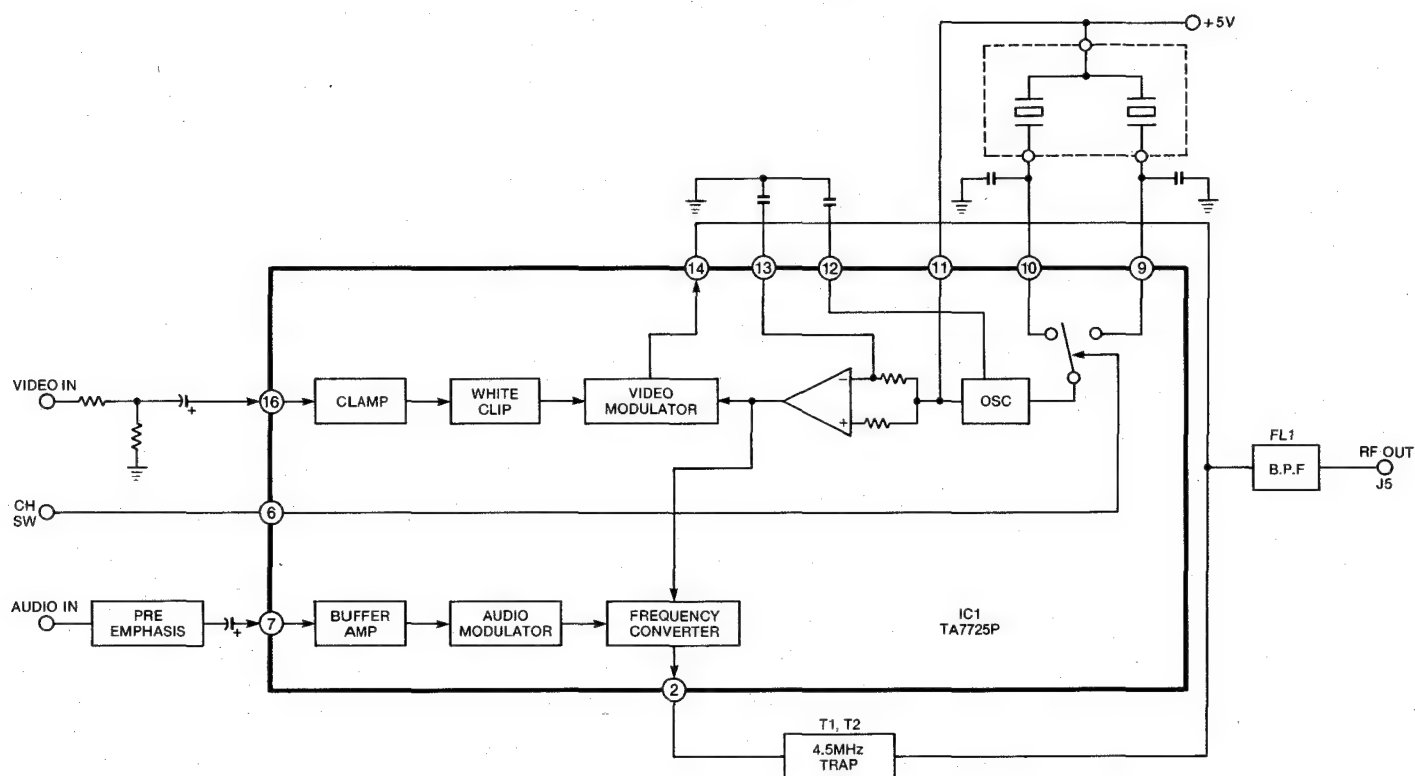
TV Demodulator C.B.A.
LOCATION OF TEST POINTS & ADJUSTMENT POINTS



RF CONVERTER BLOCK DIAGRAM (VEQS0252/0253)



RF CONVERTER BLOCK DIAGRAM (VEQS0254/0255)



Service Manual

Vol. 4

Schematic Diagrams
Printed Circuit
Board Diagrams

Video Cassette Recorder
Panasonic
 Omnivision **VHS**

PV-1230
PV-1222
PV-1225

SPECIFICATIONS

Power Source: 120 V AC $\pm 10\%$, 60 Hz $\pm 0.5\%$
 Power Consumption: Approx. 18 watts
 Television System: EIA Standard (525 lines, 60 fields)
 NTSC color signal

Video Recording

System: 2 rotary heads, helical scanning system
 Luminance: FM azimuth recording
 Color signal: Converted subcarrier phase shift recording

Audio Track: 1 track
 Tape Format: Tape width 1/2" (12.7mm), high density tape

Tape Speed: SP mode: 1-5/16 i.p.s. (33.35 mm/s)
 LP mode: 21/32 i.p.s. (16.67 mm/s)
 SLP mode: 7/16 i.p.s. (11.12 mm/s)

Record/Playback Time: 8 HRS. with 160 min. type tape used in SLP mode

FF/REW Time: Less than 6 min. with 120 min. type tape

Heads: Video: 2 rotary heads
 Audio/Control: 1 stationary head
 Erase: 1 full track erase
 1 audio track erase

Input Level: Video: VIDEO IN Jack (RCA type)
 1.0 Vp-p, 75 Ω unbalanced

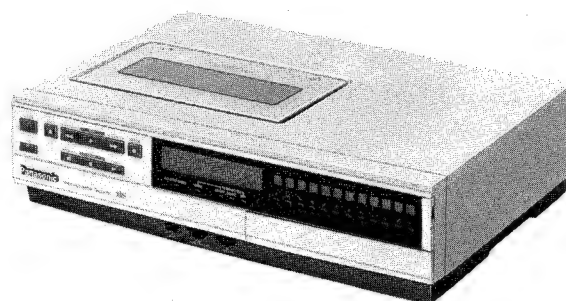
Audio: AUDIO IN Jack (RCA type)
 -20dB, 50k Ω unbalanced
 TV Tuners: VHF Input: VHF Ch2-Ch13,
 75 Ω unbalanced
 UHF Input: Ch14-Ch83,
 300 Ω balanced

Output Level: Video: VIDEO OUT Jack (RCA type)
 1.0 Vp-p, 75 Ω unbalanced

Audio: AUDIO OUT Jack (RCA type)
 -6dB, 600 Ω unbalanced
 RF Modulated: Ch3/Ch4 switchable,
 72 dB μ , (Open Voltage)
 75 Ω unbalanced

Video Horizontal

Resolution: Color: more than 230 lines
 B/W: more than 230 lines



Audio Frequency

Response: SP mode: 100 Hz ~ 8 kHz
 (10dB down) LP mode: 100 Hz ~ 6 kHz
 SLP mode: 150 Hz ~ 5 kHz

Signal-to-Noise Ratio: Video: SP mode: better than 41 dB
 LP mode: better than 41 dB
 SLP mode: better than 41 dB
 (Rohde & Schwarz noise meter)
 Audio: SP mode: better than 42 dB
 LP mode: better than 40 dB
 SLP mode: better than 40 dB

Operation

Temperature: 41°F—104°F (5°C—40°C)
 Operating Humidity: 10%—75%
 Weight: 13.0 lbs. (5.9kg)
 Dimensions: 16-15/16" (W) \times 11-5/8" (D) \times 4-1/4" (H)
 (430 mm \times 295 mm \times 108 mm)

Accessories Supplied: • Remote control unit
 • VHF connecting cable
 • 300 Ω —75 Ω transformer
 • Twin-lead cable

Available Tapes:

1/2" VHS video cassette tapes
 NV-T160 Approx. 1073 ft. (327 m), 160,
 320, or 480 min
 NV-T120 Approx. 810 ft. (247 m), 120, 240,
 or 360 min
 NV-T60 Approx. 417 ft. (127 m), 60, 120,
 or 180 min.

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

Panasonic

Matsushita Engineering & Service Company
 Division of Matsushita Electric
 Corporation of America
 50 Meadowland Parkway, Secaucus,
 New Jersey 07094

Panasonic Hawaii Inc.
 91-238 Kauhū St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Infantería, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

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IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

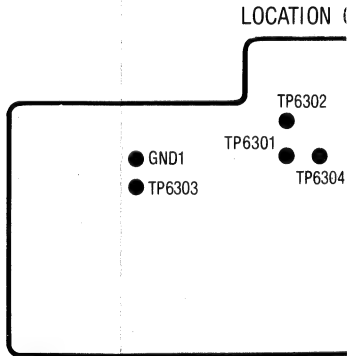
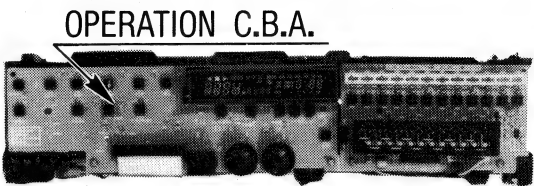
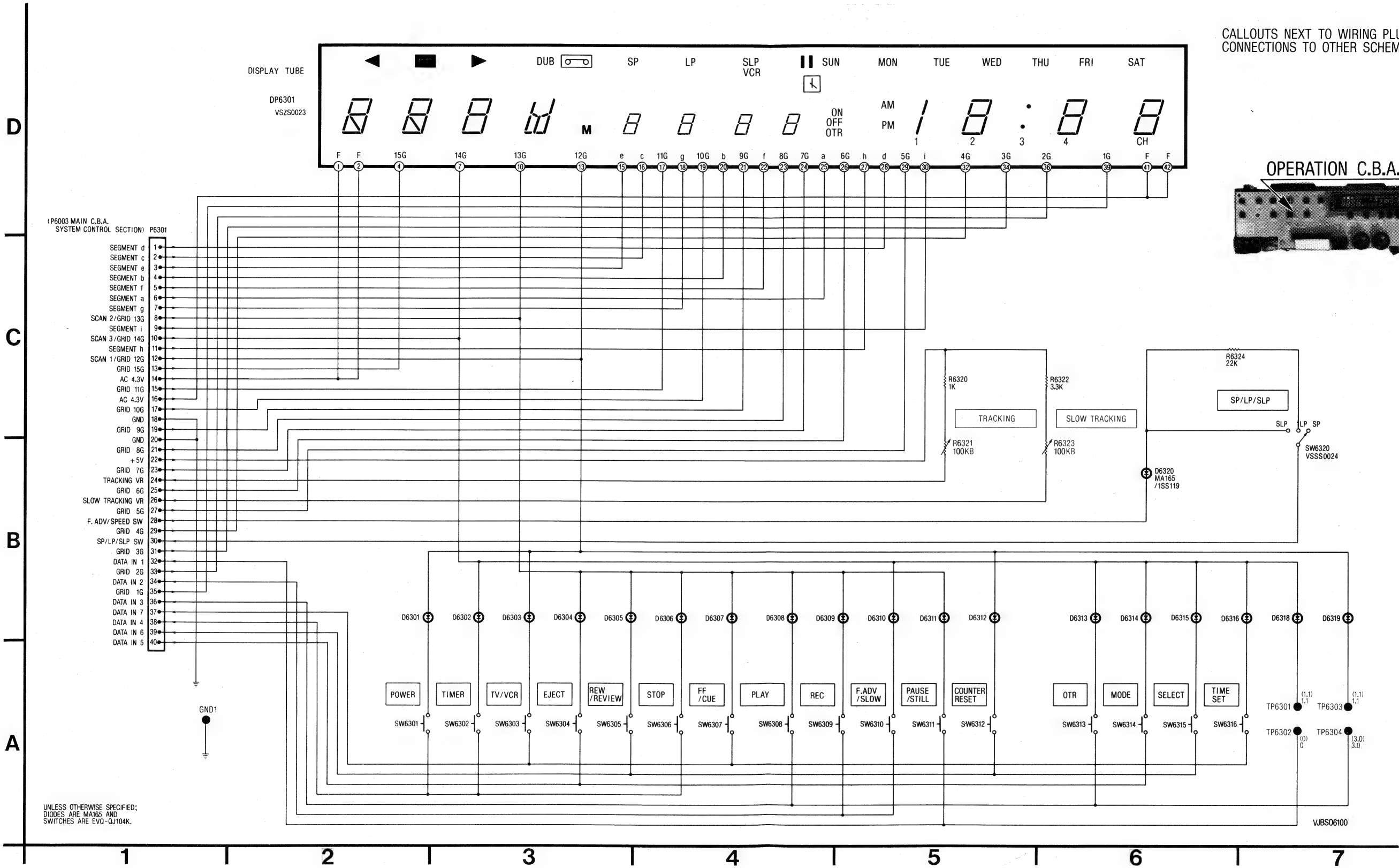


OPERATION SCHEMATIC DIAGRAM

VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

CALLOUTS NEXT TO WIRING PLUGS INDICATE
CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.



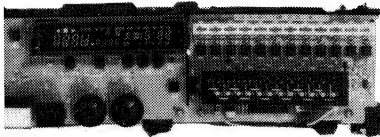
VOLTAGE MEASUREMENT:
1. CUE, REVIEW.
COLOR BAR SIGNAL IN SLP M.
2. OTHERS
COLOR BAR SIGNAL IN SP MO

NOTE: REF. NO. ON C.B.A. IS PRINTED
EXAMPLE: C.B.A....R2, REF. NO
SCHEMATIC DIAGRAM...R1
(R6302 IS ABBREVIATED TO R

FOR SEMICONDUCTOR DEVICES ARE
BEFORE REQUIRE THE SPECIAL
THE "ELECTROSTATICALLY SENSITIVE
MANUAL.

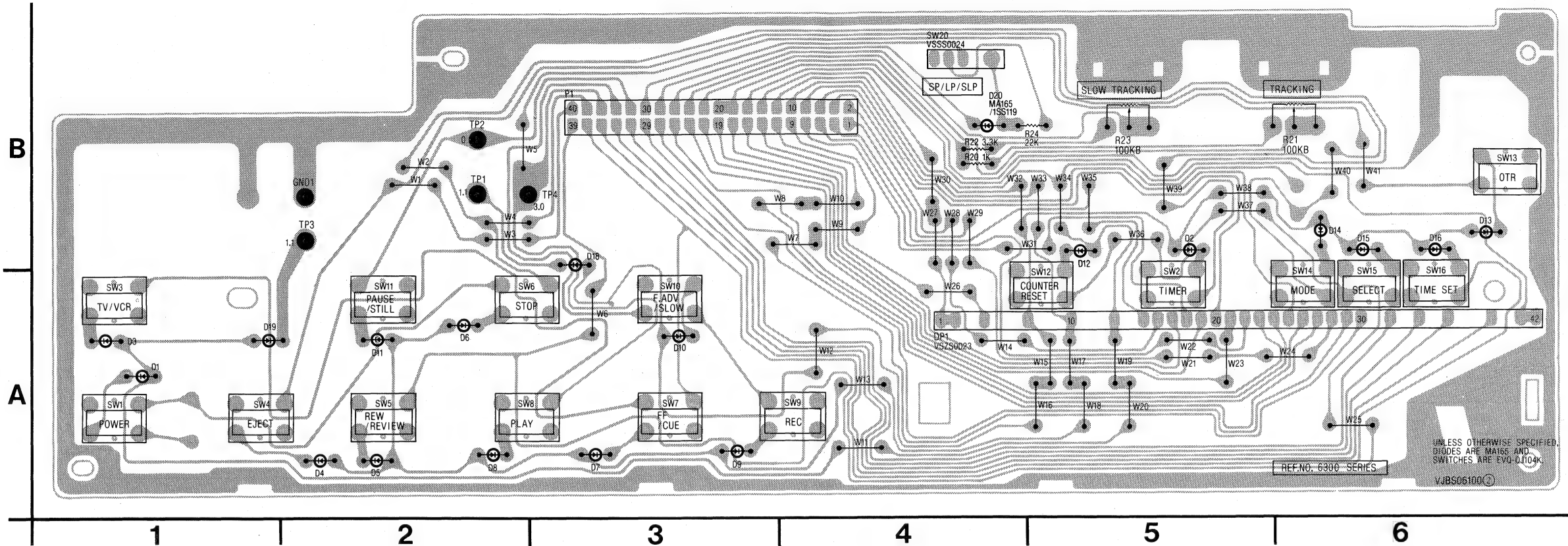
TO WIRING PLUGS INDICATE
OTHER SCHEMATIC DIAGRAM.

TION C.B.A.



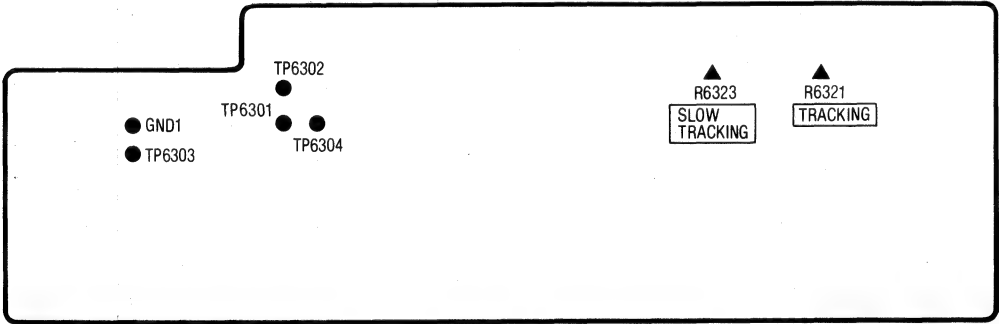
OPERATION C.B.A. VEPS06100A (PV-1230,PV-1225)
VEPS06100C (PV-1222)

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN SP REC MODE.



5320
550024

LOCATION OF TEST POINTS & ADJUSTMENT POINTS

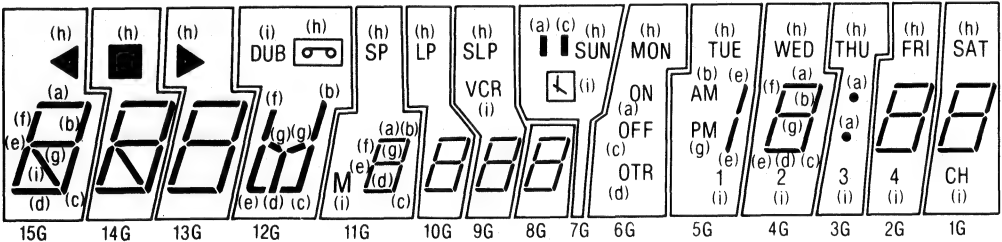


D6319 (1,1)
TP6303 (1,1)
TP6304 (3,0)
JBS06100

VOLTAGE MEASUREMENT:
1. CUE, REVIEW.
COLOR BAR SIGNAL IN SLP MODE.
2. OTHERS
COLOR BAR SIGNAL IN SP MODE.

REF.NO.	TP6301	TP6302	TP6303	TP6304
STOP	1.2	3.1	1.2	0
REC	1.1	0	1.1	3.0
PLAY	1.1	0	1.1	3.0
CUE	0.4	0	1.3	3.0
REV	1.2	3.0	1.2	0

DP6301 DISPLAY TUBE CONNECTION



PIN NO.	CONNECTION
1	FILAMENT
2	FILAMENT
3	---
4	GRID 15G
5	---
6	---
7	GRID 14G
8	---
9	---
10	GRID 13G

PIN NO.	CONNECTION
11	---
12	---
13	GRID 12G
14	---
15	SEGMENT e
16	SEGMENT c
17	GRID 11G
18	SEGMENT g
19	GRID 10G
20	SEGMENT b

PIN NO.	CONNECTION
21	GRID 9G
22	SEGMENT f
23	GRID 8G
24	GRID 7G
25	SEGMENT a
26	GRID 6G
27	SEGMENT h
28	SEGMENT d
29	GRID 5G
30	SEGMENT i

PIN NO.	CONNECTION
31	---
32	GRID 4G
33	---
34	GRID 3G
35	---
36	GRID 2G
37	---
38	---
39	GRID 1G
40	---
41	FILAMENT
42	FILAMENT

P6301

1	SEGMENT d
2	SEGMENT c
3	SEGMENT e
4	SEGMENT b
5	SEGMENT f
6	SEGMENT a
7	SEGMENT g
8	SCAN 2/GRID 13G
9	SEGMENT i
10	SCAN 3/GRID 14G
11	SEGMENT h
12	SCAN 1/GRID 12G
13	GRID 15G
14	AC 4.3V
15	GRID 11G
16	AC 4.3V
17	GRID 10G
18	GND
19	GRID 9G
20	GND

21	GRID 8G
22	+5V
23	GRID 7G
24	TRACKING VR
25	GRID 6G
26	SLOW TRACKING VR
27	GRID 5G
28	F.ADV/SPEED SW
29	GRID 4G
30	SP/LP/SLP SW
31	GRID 3G
32	DATA IN 1
33	GRID 2G
34	DATA IN 2
35	GRID 1G
36	DATA IN 3
37	DATA IN 7
38	DATA IN 4
39	DATA IN 6
40	DATA IN 5

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A....R2, REF. NO. 6300 SERIES
SCHEMATIC DIAGRAM...R6302
(R6302 IS ABBREVIATED TO R2)

4-2
SYSTEM CONTROL CIRCUIT
IC6001 MATRIX CHART,
SERVO/SYSTEM CONTROL CIRCUIT
VOLTAGE CHART

REF.NO.	IC2001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	0	0	0	0	0	3.9	4.0	0	2.1	0	1.7	4.7	0.6	4.9	5.0	0.1	5.0	0	2.0	0
REC	0	0	0	0	0	0.1	0	2.6	2.6	0	2.5	4.7	4.8	4.9	4.9	2.8	2.5	4.9	2.6	0
PLAY	0	0	0	0	0	0	0	2.7	2.7	2.7	2.5	0.3	4.8	4.9	5.0	0.1	2.5	4.9	2.6	0
CUE	0	0	0	0	0	3.9	4.0	2.6	2.6	2.8	2.5	0.3	4.8	4.9	4.9	0.4	2.4	5.0	2.6	0
REV	4.9	0	0	0	0	0	3.9	0	2.6	2.5	2.4	0.3	4.8	4.9	5.0	0.2	2.4	4.9	2.6	0
F.ADV.	0	0	0	0	0	3.9	3.9	1.3	0	2.6	2.2	0.3	4.8	0	5.0	0.1	4.1	4.9	2.6	0
SLOW(¼)	0	0	0	0	0	3.9	4.0	1.2	2.6	2.6	2.1	0.3	4.8	0	5.0	0.1	4.1	4.9	2.6	0
REF.NO.	IC2002																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	0	0.2	2.5	3.0	4.7	2.1	0	0	4.7	4.0	4.0	5.0	0	4.9	0.1	0.1	5.0	0	0	0
REC	0	2.5	2.4	3.0	4.8	2.2	4.3	0	4.7	0	0	5.0	0	5.0	1.6	2.8	2.5	0	0	0
PLAY	0	2.5	2.4	2.7	4.8	2.1	0	0	0.3	0	0	5.0	0	4.9	1.6	0	2.5	0	0	0
CUE	0	2.5	2.4	2.7	4.7	2.1	0	0	0.3	3.9	4.0	4.9	0	5.0	1.6	0.4	2.4	0	4.9	0
REV	0	2.5	2.4	2.7	4.8	2.0	0	0	0.3	3.9	0	4.9	0	4.9	0.1	0.3	2.4	4.9	4.9	0
F.ADV.	0	0.4	2.9	2.7	4.8	2.1	0	0	0.3	3.9	3.9	4.8	0	5.0	1.6	0.1	4.6	0	0	0
SLOW(¼)	0	0.4	2.8	2.7	4.7	2.1	0	0	0.3	3.8	3.9	4.9	0	5.0	1.0	0.1	4.2	0	0	0
REF.NO.	IC2002																			
MODE	21	22	23	24	25	26	27	28												
STOP	0	4.9	0	4.9	4.9	0	2.5	0.2												
REC	0	5.0	0	0	2.4	0	2.6	2.5												
PLAY	0	5.0	0	0	2.5	0	2.6	2.6												
CUE	0	0	0	3.9	2.5	0	2.7	2.5												
REV	0	4.9	0	3.8	2.5	0	2.6	2.6												
F.ADV.	0	4.9	0	3.8	2.5	0	2.6	2.5												
SLOW(¼)	0	4.9	0	3.8	2.5	0	2.6	2.5												
REF.NO.	IC2003																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
STOP	0	0.5	1.8	0	2.5	2.5	0	2.5	0	3.0	5.0	2.1	1.2	4.9	4.7	4.9	4.9	0		
REC	0	0.4	2.4	0	2.5	2.5	0	2.7	4.3	3.0	5.0	2.3	1.1	2.5	2.8	4.8	3.8	0		
PLAY	0.1	0	1.8	0	2.5	2.5	0	2.5	0	2.7	4.9	2.1	1.0	2.5	2.8	4.8	3.8	0		
CUE	0.4	0.6	1.9	0	2.5	2.5	0	2.5	0	2.7	4.9	2.1	1.0	2.5	2.8	4.8	3.8	0		
REV	0	0	1.9	0	2.5	2.5	0	2.5	0	2.8	5.0	2.0	1.0	2.5	2.8	4.8	0	0		
F.ADV.	0	0.4	1.9	0	2.5	2.5	0	2.5	0	2.7	5.0	2.1	1.0	2.5	2.8	4.8	3.8	0		
SLOW(¼)	0	0.4	1.9	0	2.5	2.5	0	2.5	0	2.7	4.9	2.1	1.0	2.5	2.8	4.8	3.8	0		
REF.NO.	IC2004																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	14.5	14.5	2.6	2.4	0	0.9	12.4	0.1	12.1	0.7	2.1	0	1.1	0.5	0.7	1.7	1.9	0.2	4.9	4.9
REC	0	14.0	2.6	2.4	0	2.0	12.4	0.1	11.2	0.9	2.6	0	2.6	0.7	0.6	1.8	1.8	3.1	4.8	3.8
PLAY	14.2	14.1	2.6	2.4	0	2.0	12.4	0.1	11.3	0.9	2.7	0	2.6	0.7	0.6	1.8	1.8	3.1	4.8	3.8
CUE	14.2	14.2	2.6	2.4	0	2.0	12.4	0.1	11.3	0.8	2.7	0	2.6	0.7	0.6	1.9	1.9	3.1	4.4	3.8
REV	14.2	14.2	2.6	2.4	0	2.0	12.4	0.1	11.3	0.8	2.6	14.2	2.6	0.7	0.6	1.9	1.9	3.1	4.8	3.8
F.ADV.	14.2	14.2	2.6	2.4	0	2.0	12.4	0.1	11.3	0.8	2.6	14.2	2.6	0.7	0.6	1.8	1.8	3.1	4.8	3.8
SLOW(¼)	14.2	14.2	2.5	2.4	0	2.0	12.4	0.1	11.3	0.8	2.6	0	2.6	0.7	0.6	1.8	1.8	3.1	4.8	3.8
REF.NO.	IC2004				IC2005															
MODE	21	22	23	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
STOP	14.5	★	14.5	0	0	4.9	0	0	0.2	0	0	5.0	2.1	1.7	★	2.1	2.1	4.9	0.1	0
REC	14.2	★	14.0	0	0	4.8	0	0	0.1	0	0	4.9	0	2.5	★	2.7	2.6	2.4	2.8	0
PLAY	14.4	★	14.1	0	0	0	4.9	0	0.1	0	0	5.0	0	2.5	★	2.6	2.7	2.5	0.1	0
CUE	14.4	★	14.2	0	0	0	4.9	0	0.1	0	0	4.9	0	2.5	★	2.7	2.7	2.5	0.4	0
REV	14.4	★	14.2	0	4.9	0	4.9	0	0.1	0	0	4.9	4.7	0	★	2.6	2.6	2.5	0.3	0
F.ADV.	14.4	★	14.2	0	0	0	0	0.1	0.2	0.1	0	4.9	0.2	2.0	★	2.6	2.7	2.5	0	2.3
SLOW(¼)	14.4	★	14.2	0	0	0	0	0.1	0.2	0.1	0	4.9	0	2.0	★	2.7	2.6	2.5	0.1	2.5
REF.NO.	IC2006																			
MODE	1	2	3	4	5	6	7	8												
STOP	1.1	1.1	1.1	0	2.5	2.5	2.5	5.0												
REC	2.5	2.6	2.6	0	2.5	2.5	2.5	5.0												
PLAY	2.6	2.6	2.6	0	2.5	2.5	2.5	5.0												
CUE	2.6	2.6	2.6	0	2.5	2.5	2.5	5.0												
REV	2.6	2.6	2.6	0	2.5	2.4	2.5	5.0												
F.ADV.	2.6	2.5	2.4	0	2.5	2.4	2.6	4.9												
SLOW(¼)	2.6	2.6	2.6	0	2.5	2.5	2.6	4.9												

REF.NO.	IC6001																																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																
STOP	0	0	0	0	4.9	0	0	0	0	3.7	5.0	4.9	4.9	4.7	0	4.9	0	0.6	2.5	1.9																
FF	0	0	0	4.9	4.9	4.8	0	4.9	0	3.7	4.9	4.9	4.9	0	0	4.8	0	0.5	2.5	1.8																
REW	0	0	0	4.8	4.9	4.7	0	0	0	3.7	4.9	4.9	4.7	0	4.9	4.8	0	0.5	2.4	1.8																
REC	0	0	0	0	4.9	0	4.9	0	0	3.7	4.9	4.9	0	0	0	4.8	0	0.6	2.4	1.9																
PLAY	0	0	0	0	4.9	4.9	0	0	0	0	4.9	4.9	4.9	0	0	0	0	0.6	2.4	1.9																
CUE	0	0	0	0	4.9	4.9	4.9	0	4.9	3.7	4.9	4.9	4.9	0	0	0	4.9	0.6	2.4	1.8																
REV	0	0	0	0	4.9	4.9	4.9	0	4.9	3.7	4.9	4.9	4.9	0	4.9	0	4.9	0.6	2.4	1.8																
F.ADV.	0	0	0	2.2	0	0	4.8	0	0	3.7	4.9	4.9	4.9	0	0	0	4.9	0.6	2.4	1.8																
SLOW(¼)	0	0	0	0	0	0	0	0	0	3.7	4.9	4.9	4.9	0	0	0	4.9	0.6	2.4	1.9																
REF.NO.	IC6001																																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40																
STOP	3.5	2.3	4.9	1.0	0	0	3.1	3.3	0	3.1	3.1	0.1	0.2	4.7	0	11.9	-28.3	-28.3	-28.3	-28																
FF	3.5	2.3	4.9	0.9	0	0	0.5	0.5	0	3.0	3.1	2.0	0.2	4.7	0	11.8	-28.3	-28.3	-28.3	-28																
REW	3.4	2.2	4.9	0.9	0	0	0.5	0.5	0	3.0	3.0	2.0	0	4.8	0	10.3	-28.3	-28.3	-28.3	-28																
REC	3.5	3.0	4.9	1.0	0	0	0.5	0.5	3.0	0.5	0	★	0.2	4.7	0	0.3	-28.2	0	-28.2	-28																
PLAY	3.5	0	4.9	1.0	0	0	0.5	0.5	3.0	0.5	0	★	0.1	0.3	0.2	★	★	★	★	-28																
CUE	3.5	3.0	0.9	1.0	0	0	3.0	3.3	3.0	0.5	0	★	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28																
REV	3.5	2.2	0.3	0.9	0	0	3.0	3.2	0	0.5	3.0	★	0.2	0.3	0.2	11.9	-28.5	-28.4	-28.4	-28																
F.ADV.	3.5	3.0	2.7	0.9	0	0	3.0	3.2	3.0	0.5	0	0.1	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28																
SLOW(¼)	3.5	3.0	4.9	0	0	0	3.0	3.2	3.0	0.5	0	4.2	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28																
REF.NO.	IC6001																																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60																
STOP	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-26.4	-26.4	-26.4	-26.7	★	-28.0	★	★	★	★	★	★	★																
FF	-28.3	-28.4	-28.4	-28.3	-28.4	-28.4	-28.3	-26.4	-26.4	-26.4	-26.7	★	-28.0	★	★	★	★	★	★	★																
REW	-28.3	-28.3	-28.3	-28.2	-28.3	-28.3	-28.3	-26.4	-26.3	-26.3	-26.7	★	-24.9	★	★	★	★	★	★	★																
REC	-28.2	-28.2	-28.2	-28.2	-28.2	-28.2	-28.2	-26.3	-26.3	-26.3	-26.6	★	-24.6	★	★	★	★	★	★	★																
PLAY	-28.3	-28.3	-28.3	-28.3	-28.4	-28.4	-28.4	-26.4	-26.4	-26.4	-26.7	★	-28.4	★	★	★	★	★	★	★																
CUE	-28.4	-28.4	-28.4	-28.3	-28.4	-28.4	-28.4	-26.4	-26.4	-26.4	-26.7	★	-24.8	★	★	★	★	★	★	★																
REV	-28.5	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	-26.5	-26.5	-26.5	-26.8	★	-24.9	★	★	★	★	★	★	★																
F.ADV.	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	-26.5	-26.4	-26.4	-26.8	★	-24.9	★	★	★	★	★	★	★																
SLOW(¼)	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	-28.4	-26.4	-26.4	-26.4	-26.8	★	-28.0	★	★	★	★	★	★	★																
REF.NO.	IC6001					IC6003																														
MODE	61	62	63	64	1	2	3	4	5	6	7	8	9																							
STOP	-30.0	2.3	2.4	4.9	12.0	14.5	12.4	0	0	0	12.4	14.5	12.0																							
FF	-30.0	2.2	2.3	4.9	12.0	14.4	12.3	0	0	0	12.3	14.4	11.9																							
REW	-30.0	2.2	2.3	0	11.9	14.4	12.4	0	0	0	12.3	14.4	11.9																							
REC	-30.1	2.3	2.4	4.9	12.0	14.3	12.4	0	0	0	12.4	14.3	12.0																							
PLAY	-29.9	2.3	2.3	4.9	12.0	14.4	12.4	0	0	0	12.4	14.4	12.0																							
CUE	-30.1	2.3	2.4	4.9	12.0	14.4	12.4	0	0	0	12.4	14.4	12.0																							
REV	-30.1	2.2	2.3	4.9	12.0	14.4	12.4	0	0	0	12.4	14.4	11.9																							
F.ADV.	-30.1	2.2	2.3	4.9	12.0	14.5	12.4	0	0	0	12.4	14.5	11.9																							
SLOW(¼)	-30.1	2.2	2.3	4.9	11.9	14.5	12.4	0	0	0	12.4	14.5	11.9																							
REF.NO.	TP6001				TP6002				TP6003				TP2001				TP2002				TP2003				TP2004				TP2005				TP2007			
MODE	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
STOP	3.8	1.0	0.2	0	1.9	0	2.5	2.5	1.5																											
FF	3.7	0.9	0.1																																	
REW	3.7	0.9	0.1																																	
REC	3.7	1.0	0.1	0	2.4	2.5	2.6	2.4	2.5																											
PLAY	3.7	1.0	0.1	0	1.9	2.5	2.6	2.4	2.5																											
CUE	3.7	0.8	0.1	0	1.9	2.5	2.6	2.4	2.5																											
REV	3.7	0.9	0.1	0	1.9	2.5	2.5	2.4	2.5																											
F.ADV.	3.7	1.0	0.1	0	1.8	2.5	2.6	2.8	2.1																											
SLOW(¼)	3.7	1.0	0.1	0	1.9	2.5	2.6	2.8	2.0																											

32	33	34	35	36	37	38	39	40
0.1	0.2	4.7	0	11.9	-28.3	-28.3	-28.3	-28.3
2.0	0.2	4.7	0	11.8	-28.3	-28.3	-28.3	-28.3
2.0	0	4.8	0	10.3	-28.3	-28.3	-28.3	-28.3
★	0.2	4.7	0	0.3	-28.2	0	-28.2	-28.2
★	0.1	0.3	0.2	★	★	★	★	-28.3
★	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28.4
★	0.2	0.3	0.2	11.9	-28.5	-28.4	-28.4	-28.4
0.1	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28.4
4.2	0.2	0.3	3.9	11.9	-28.4	-28.4	-28.4	-28.4

52	53	54	55	56	57	58	59	60
★	-28.0	★	★	★	★	★	★	★
★	-28.0	★	★	★	★	★	★	★
★	-24.9	★	★	★	★	★	★	★
★	-24.6	★	★	★	★	★	★	★
★	-28.4	★	★	★	★	★	★	★
★	-24.8	★	★	★	★	★	★	★
★	-24.9	★	★	★	★	★	★	★
★	-24.9	★	★	★	★	★	★	★
★	-28.0	★	★	★	★	★	★	★

ODE.
DE.
ARY TO MEASURE.

IC6001 KEY MATRIX

★SEE MODE SWITCH POSITION CODE CHART.

SYSTEM CONTROL SECTION	
Q6001	6-E
Q6002	6-E
Q6003	6-D
Q6004	3-B
Q6005	8-B
Q6009	5-A
Q6010	5-B
Q6011	5-A
Q6012	6-B
Q6013	2-D
Q6016	3-B
Q6017	2-C
Q6018	7-A
Q6019	4-B


IC6001 MATRIX CHART

IC6001 SAFETY DEVICE

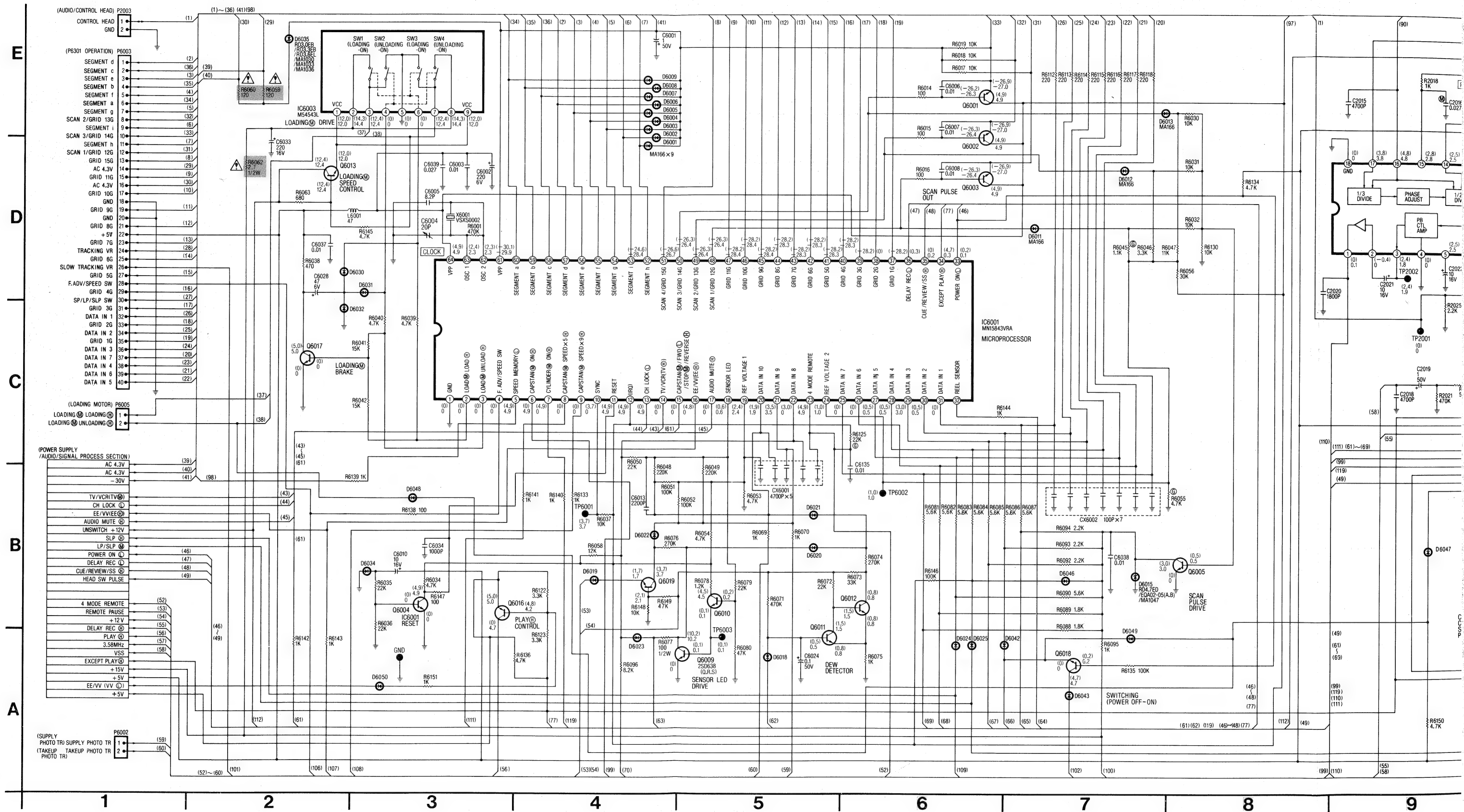
IC6001 MODE SWITCH POSITION CODE

MODE SWITCH POSITION	DATA IN	POSITION 1★	POSITION 2★	POSITION 3★
		29(DATA IN 3)	30(DATA IN 2)	31(DATA IN 1)
EJECT		L	H	H
STOP		H	L	H
FF/REW		H	L	H
REC/ PAUSE		H	L	L
REVIEW		H	L	L
PLAY		L	H	L

MAIN SCHEMATIC DIAGRAM (SERVO/SYSTEM CONTROL SECTION)

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET



CE: THE SIGN HAVE SPECIAL FOR SAFETY. THESE COMPONENTS, USE ONLY THE

VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.

CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

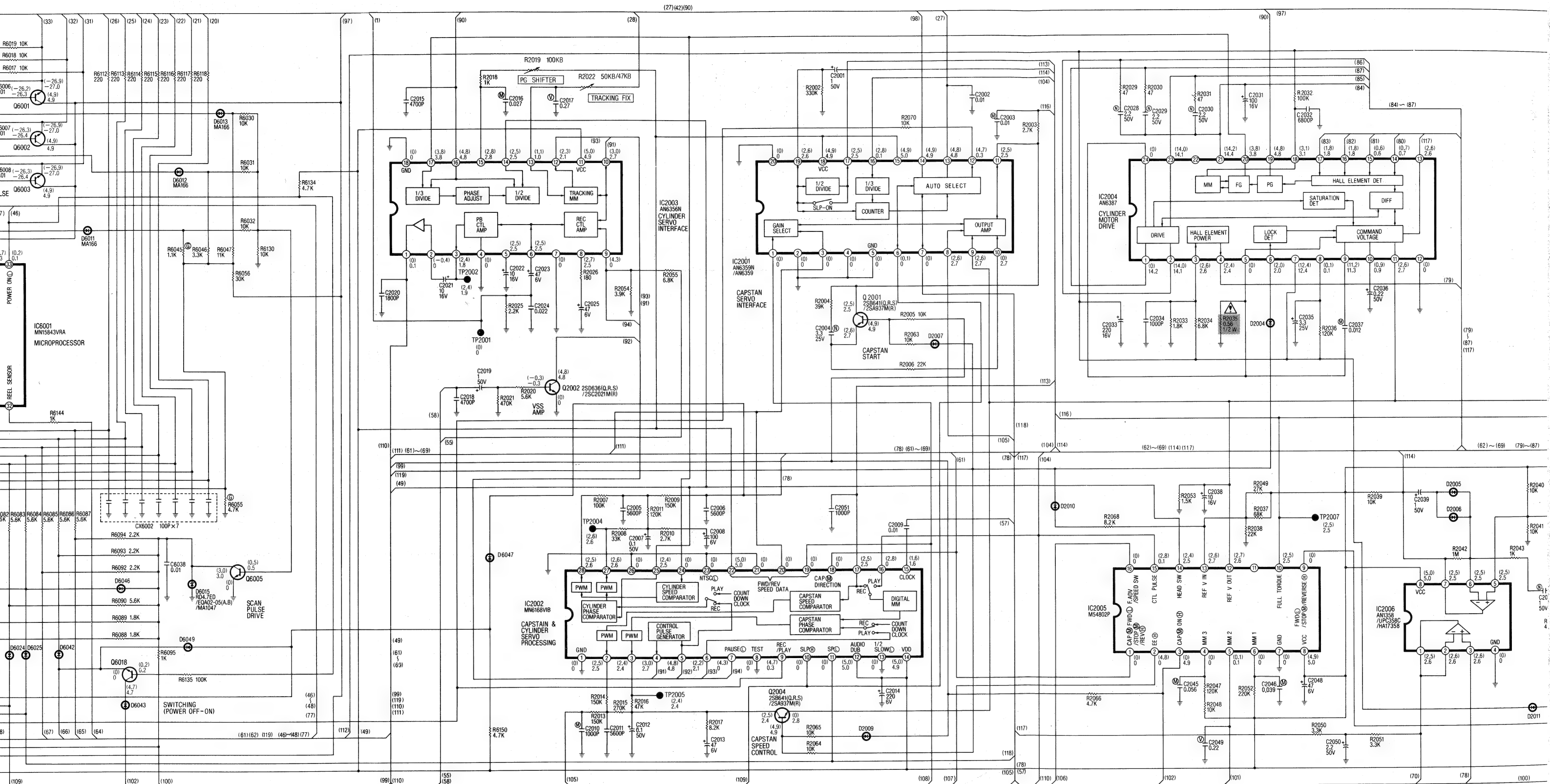
SERVO SECTION

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 2000 SERIES
SCHEMATIC DIAGRAM---R2002
(R2002 IS ABBREVIATED TO R2)

SYSTEM CONTROL SECTION

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 6000 SERIES
SCHEMATIC DIAGRAM---R6002
(R6002 IS ABBREVIATED TO R2)

SPECIAL N
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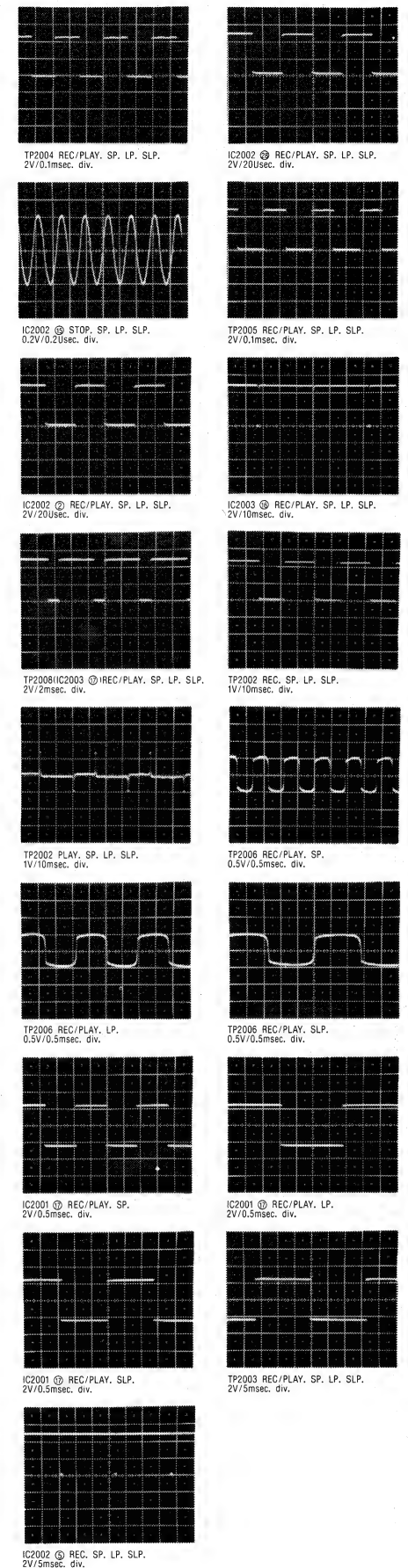
14

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NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A....R2, REF. NO. 2000 SERIES
SCHEMATIC DIAGRAM...R2002
(R2002 IS ABBREVIATED TO R2)

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A....R2, REF. NO. 6000 SERIES
SCHEMATIC DIAGRAM...R6002
(R6002 IS ABBREVIATED TO R2)

4-3
MAIN SCHEMATIC DIAGRAM
(SERVO/SYSTEM CONTROL SECTION)



UNLESS OTHERWISE SPECIFIED;
PNP TRANSISTORS ARE 2SB641(Q,R,S) / 2SA937M(R,S)
NPN TRANSISTORS ARE 2SD636(Q,R,S) / 2SC2021M(R,S)
DIODES ARE MA165/1SS119 AND
WATTAGE OF RESISTORS ARE 1/4W.

MAIN SCHEMATIC DIAGRAM (POWER SUPPLY/AUDIO/SIGNAL PROCESS SECTION)

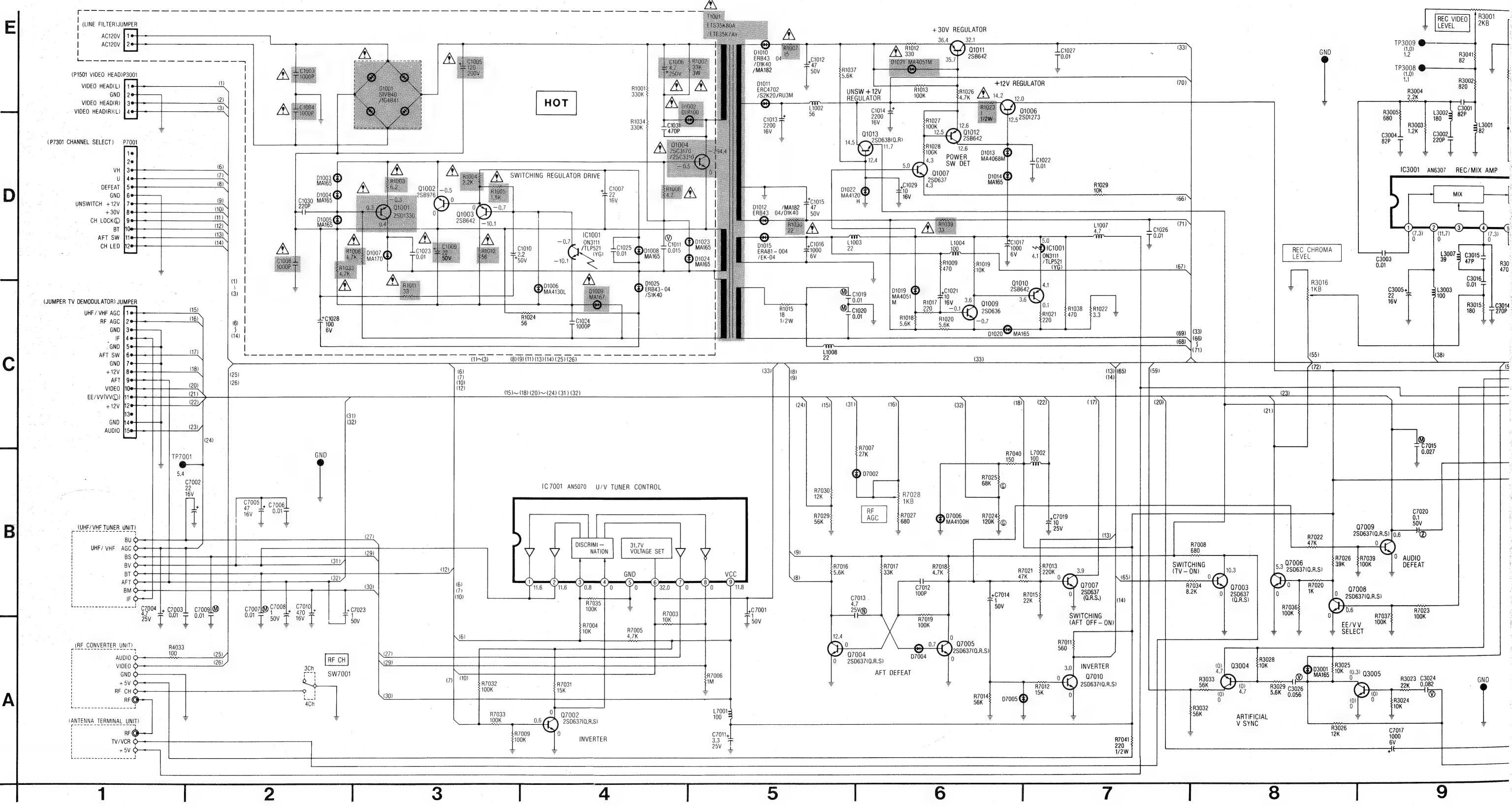
IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN ⚠ HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.


AUDIO SECTION
VOLUME MEASUREMENT
MONO SIGNAL
MONO SIGNAL

IS A HOT CIRCUIT.
BE CAREFUL WHEN SERVICING.

POWER SUPPLY/DEMODULATOR SIGNAL PROCESS SECTION
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.

LUMINANCE SIGNAL PROCESS SECTION
VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.



IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

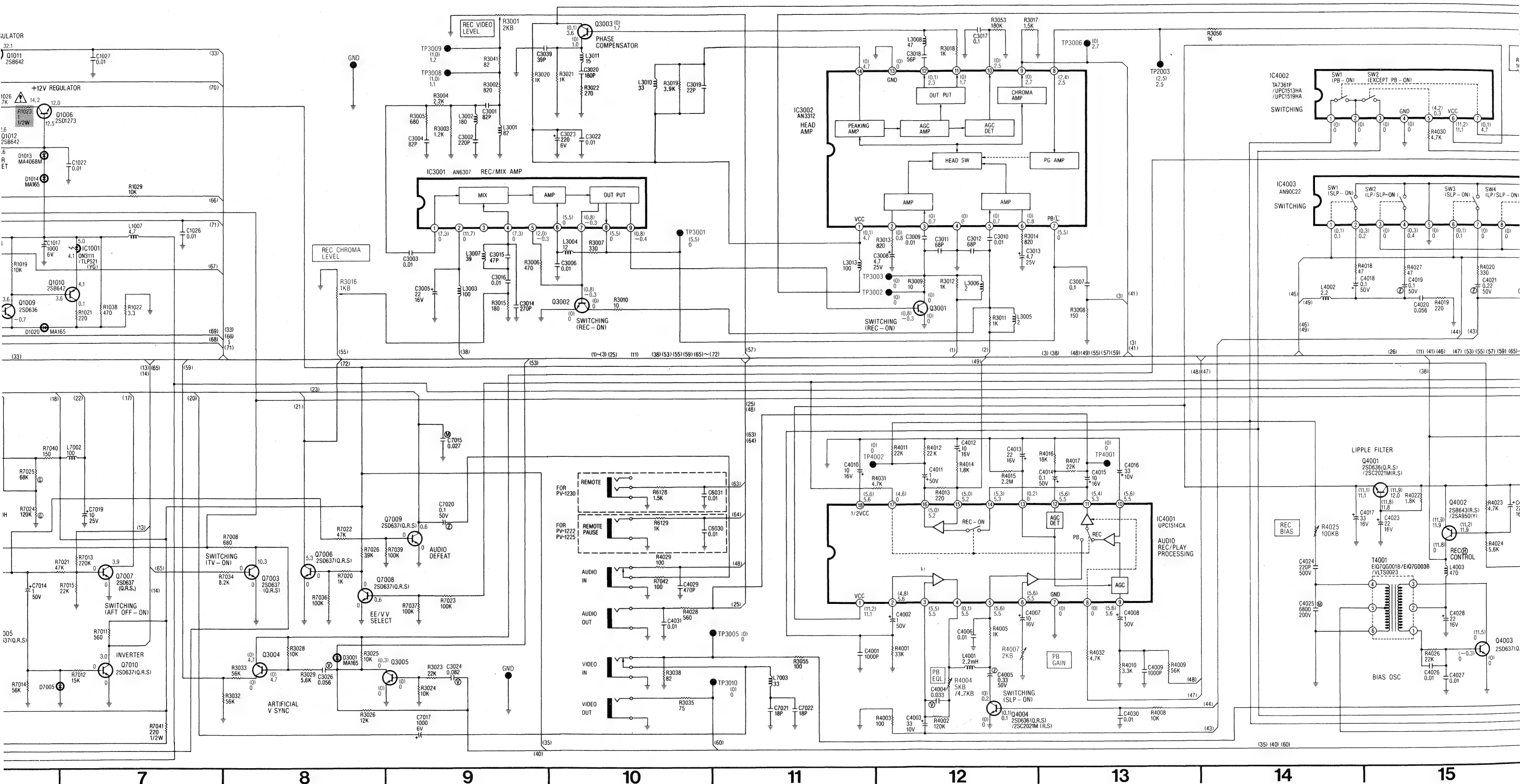
AUDIO SECTION
VOLTAGE MEASUREMENT:
MONO SCOPE SIGNAL IN SP REC MODE WITH BRACKET.
MONO SCOPE SIGNAL IN SP PLAY MODE WITHOUT BRACKET.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

POWER SUPPLY SECTION
NOTE: REF. NO. ON C.B.A. IS 1
EXAMPLE: C.B.A. ...R2, R
SCHEMATIC DIAGRA
(R1002 IS ABBREVIATED

DEMODULATOR SIGNAL PROCES
NOTE: REF. NO. ON C.B.A. IS F
EXAMPLE: C.B.A....R2, R
SCHEMATIC DIAGRAM
(R7002 IS ABBREVIATED

CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.



SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE (ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

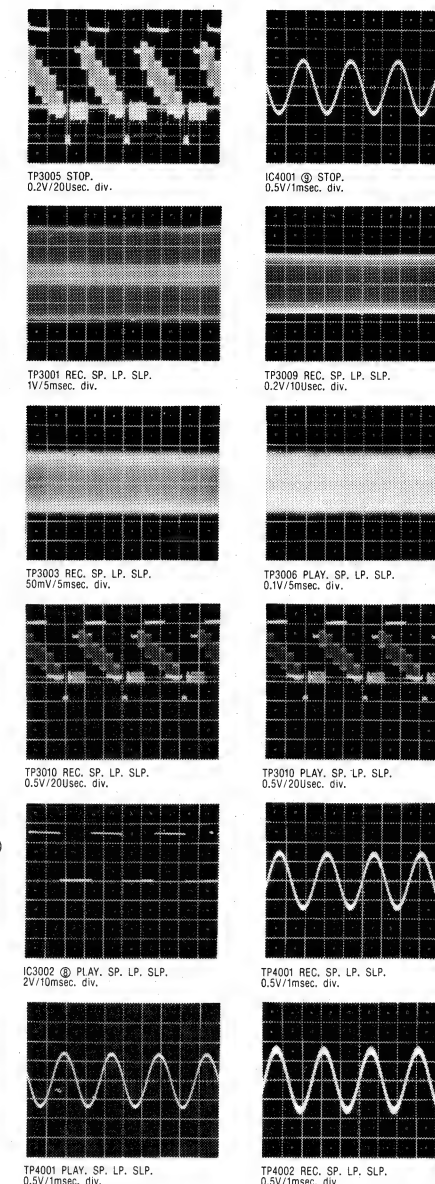
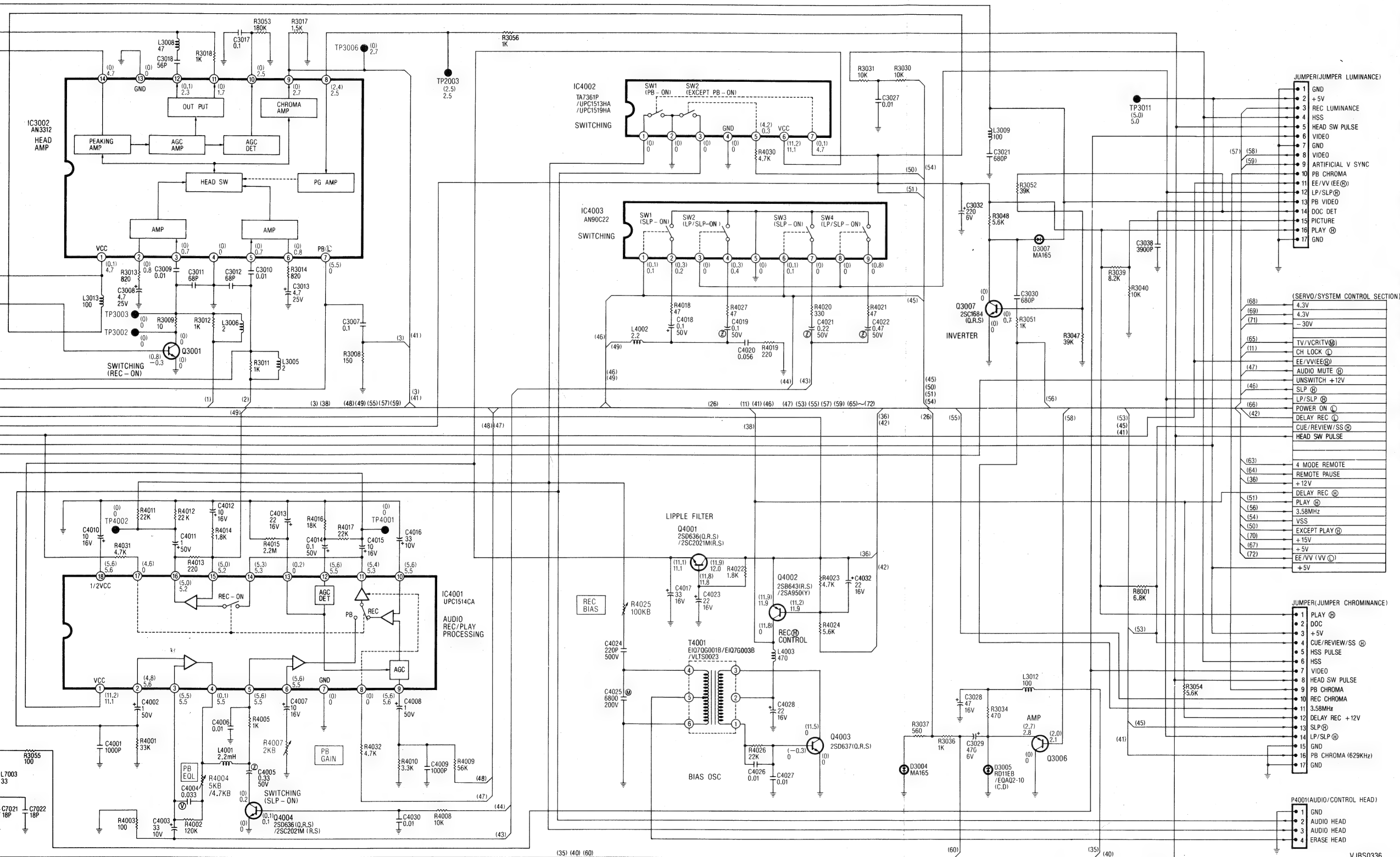
CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

POWER SUPPLY SECTION
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 1000 SERIES
SCHEMATIC DIAGRAM---R1002
(R1002 IS ABBREVIATED TO R2)

DEMODULATOR SIGNAL PROCESS SECTION
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 7000 SERIES
SCHEMATIC DIAGRAM---R7002
(R7002 IS ABBREVIATED TO R2)

AUDIO SECTION
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 4000 SERIES
SCHEMATIC DIAGRAM---R4002
(R4002 IS ABBREVIATED TO R2)

LUMINANCE SIGNAL PROCESS SECTION
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 3000 SERIES
SCHEMATIC DIAGRAM---R3002
(R3002 IS ABBREVIATED TO R2)



POWER SUPPLY SECTION

Q1001	3-D
Q1002	3-D
Q1003	3-D
Q1004	5-D
Q1006	6-E
Q1007	6-D
Q1009	6-C
Q1010	7-C
Q1011	6-E
Q1012	6-D
Q1013	6-D

AUDIO SECTION

Q4001	15-B
Q4002	15-B
Q4003	15-A
Q4004	12-A

LUMINANCE SIGNAL PROCESS SECTION

Q3001	12-C
Q3002	10-C
Q3003	10-E
Q3004	8-A
Q3005	9-A
Q3006	16-A
Q3007	16-A

DEMODULATOR SIGNAL PROCESS SECTION


Q7002	4-A
Q7003	8-B
Q7004	5-A
Q7005	6-A
Q7006	8-B
Q7007	7-B
Q7008	8-B
Q7009	9-B
Q7010	7-A

UNLESS OTHERWISE SPECIFIED:
PNP TRANSISTORS ARE 2SB641(R.S.)
NPN TRANSISTORS ARE 2SD636(R.S.)
DIODES ARE MA165/ISS19 AND
WATTAGE OF RESISTORS IS 1/4W.

VJBS0336

MAIN C.B.A. VEPS0336A1 (PV-1230)
VEPS0336C1 (PV-1222,PV-1225)

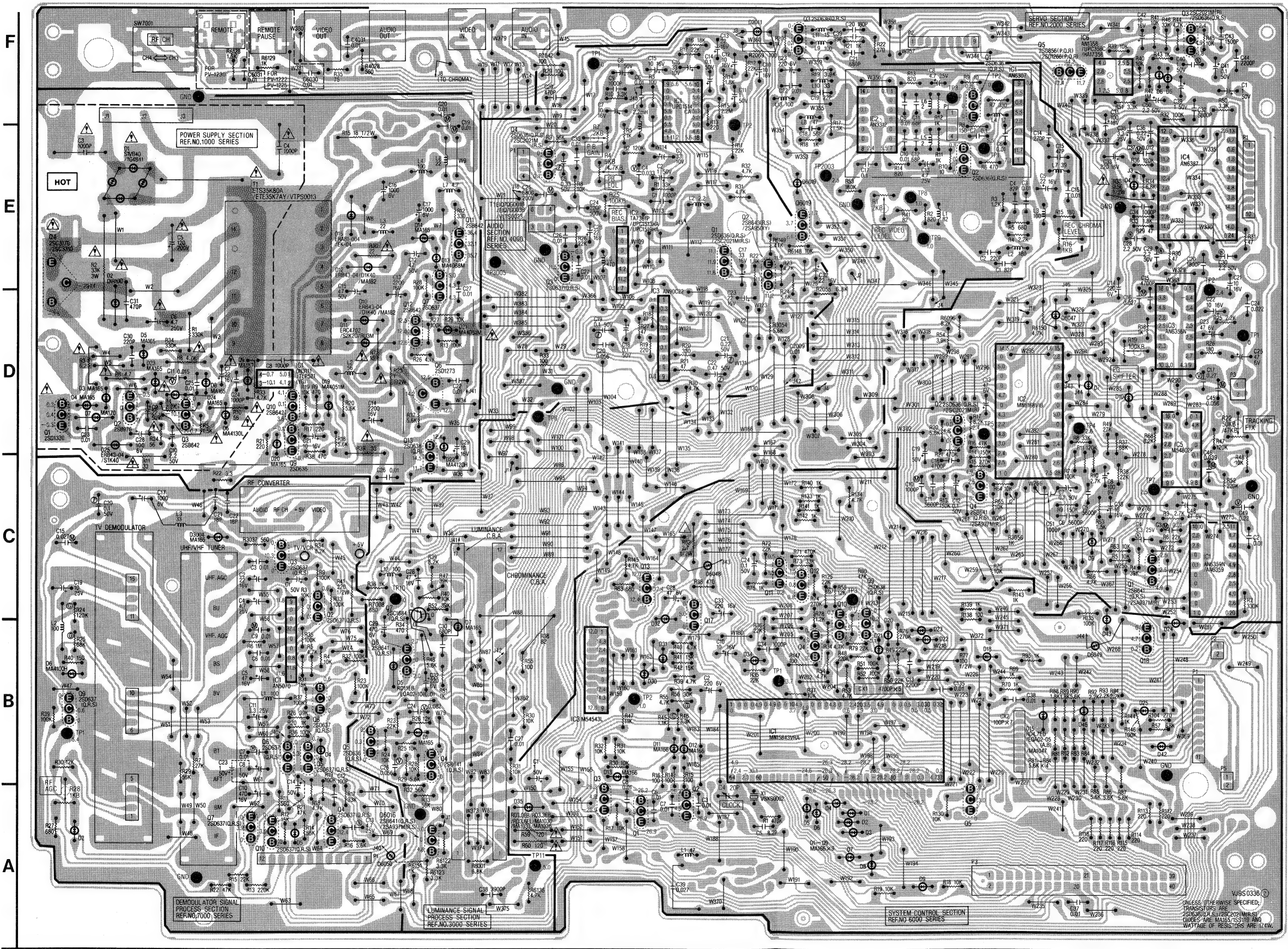
IS A HOT CIRCUIT. BE CAREFUL WHEN SERVICING.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

SERVO/SYSTEM CONTROL/LUMINANCE SIGNAL PROCESS SECTION
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN SP REC MODE.

AUDIO SECTION
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.

POWER SUPPLY/DEMULATOR SIGNAL PROCESS SECTION
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.



SERVO SECTION	
Q1	7-C
Q2	6-D
Q3	8-F
Q4	6-C
Q5	7-F

DEMULATOR SIGNAL PROCESS SECTION	
Q2	2-C
Q3	2-C
Q4	2-A
Q5	2-B
Q6	2-B
Q7	2-A
Q8	2-B
Q9	1-B
Q10	2-A

SYSTEM CONTROL SECTION	
Q1	4-A
Q2	5-A
Q3	4-A
Q4	5-B
Q5	6-A
Q9	6-B
Q10	5-B
Q11	5-C
Q12	5-C
Q13	4-C
Q16	3-A
Q17	5-C
Q18	7-B
Q19	5-E

AUDIO SECTION	
Q1	5-E
Q2	5-E
Q3	4-E
Q4	4-E

LUMINANCE SIGNAL PROCESS SECTION	
Q1	6-F
Q2	6-E
Q3	5-F
Q4	3-B
Q5	3-B
Q6	3-B
Q8001	4-A

POWER SUPPLY SECTION	
Q1	1-D
Q2	1-D
Q3	2-D
Q4	1-E
Q6	3-D
Q7	3-E
Q9	2-D
Q10	2-D
Q11	3-E
Q12	3-D
Q13	2-C

P6001	1 DEW SENSOR
2	SENSOR LED PULSE
3	+5V
4	REEL SENSOR
5	POSITION 3
6	POSITION 2
7	POSITION 1
8	CASSETTE DOWN
9	SAFETY TAB SW
10	GND
11	UNSWITCH +12V

P6002	1 SUPPLY PHOTO TR
2	TAKEUP PHOTO TR

P6003	1 SEGMENT d
2	SEGMENT c
3	SEGMENT e
4	SEGMENT b
5	SEGMENT f
6	SEGMENT a
7	SEGMENT g
8	SCAN 2/GRID 13G
9	SEGMENT i
10	SCAN 3/GRID 14G
11	SEGMENT h
12	SCAN 1/GRID 12G
13	GRID 15G
14	AC 4.3V
15	GRID 11G
16	AC 4.3V
17	GRID 10G
18	GND
19	GRID 9G
20	GND
21	GRID 8G
22	+5V
23	GRID 7G
24	TRACKING VR
25	GRID 6G
26	SLOW TRACKING VR
27	GRID 5G
28	F.ADV./SPEED SW
29	GRID 4G
30	SP/LP/SLP SW
31	GRID 3G
32	DATA IN 1
33	GRID 2G
34	DATA IN 2
35	GRID 1G
36	DATA IN 3
37	DATA IN 7
38	DATA IN 4
39	DATA IN 6
40	DATA IN 5

P6005	1 LO
2	LO

P2001	1 VH
2	HEP
3	HEP
4	HEP
5	HEP
6	VM
7	GNI
8	MA
9	MA
10	MA

P2003	1 COF
2	GNI

SERVO SECTION	
Q1	7-C
Q2	6-D
Q3	8-F
Q4	6-C
Q5	7-F

DEMODULATOR SIGNAL PROCESS SECTION	
Q2	2-C
Q3	2-C
Q4	2-A
Q5	2-B
Q6	2-B
Q7	2-A
Q8	2-B
Q9	1-B
Q10	2-A

SYSTEM CONTROL SECTION	
Q1	4-A
Q2	5-A
Q3	4-A
Q4	5-B
Q5	6-A
Q9	6-B
Q10	5-B
Q11	5-C
Q12	5-C
Q13	4-C
Q16	3-A
Q17	5-C
Q18	7-B
Q19	5-E

P6001	
1	DEW SENSOR
2	SENSOR LED PULSE
3	+5V
4	REEL SENSOR
5	POSITION 3
6	POSITION 2
7	POSITION 1
8	CASSETTE DOWN
9	SAFETY TAB SW
10	GND
11	UNSWITCH +12V

1	SUPPLY PHOTO TR
2	TAKEUP PHOTO TR

AUDIO SECTION	
Q1	5-E
Q2	5-E
Q3	4-E
Q4	4-E

P6003	
1	SEGMENT d
2	SEGMENT c
3	SEGMENT e
4	SEGMENT b
5	SEGMENT f
6	SEGMENT a
7	SEGMENT g
8	SCAN 2/GRID 13G
9	SEGMENT i
10	SCAN 3/GRID 14G
11	SEGMENT h
12	SCAN 1/GRID 12G
13	GRID 15G
14	AC 4.3V
15	GRID 11G
16	AC 4.3V
17	GRID 10G
18	GND
19	GRID 9G
20	CND

DOMINANCE SIGNAL PROCESS SECTION	
Q1	6-F
Q2	6-E
Q3	5-F
Q4	3-B
Q5	3-B
Q6	3-B
Q8001	4-A





POWER SUPPLY SECTION	
Q1	1-D
Q2	1-D
Q3	2-D
Q4	1-E
Q6	3-D
Q7	3-E
Q9	2-D
Q10	2-D
Q11	3-E
Q12	3-D
Q13	2-C

23	GRID 7G
24	TRACKING VR
25	GRID 6G
26	SLOW TRACKING VR
27	GRID 5G
28	F.ADV/SPEED SW
29	GRID 4G
30	SP/LP/SLP SW
31	GRID 3G
32	DATA IN 1
33	GRID 2G
34	DATA IN 2
35	GRID 1G
36	DATA IN 3
37	DATA IN 7
38	DATA IN 4
39	DATA IN 6
40	DATA IN 5

1	LOADING _(M) LOADING _(H)
2	LOADING _(M) UNLOADING _(H)

P2001	
1	VH+
2	HEM
3	HEM
4	HES
5	HES
6	GND
7	VM
8	MAIN COIL 1
9	MAIN COIL 3
10	MAIN COIL 2

1	CONTROL HEAD
2	GND

P2002	
1	GND
2	CAP  FG
3	VM
4	GND
5	RCC
6	ERROR
7	REF VOLTAGE
8	+5V
9	FORWARD  STOP  REVERSE 

JUMPER (TO CHROMINANCE)	
1	PLAYⓈ
2	DOC
3	+5V
4	CUE/REVIEW/SSⓈ
5	HSS PULSE
6	HSS
7	VIDEO
8	HEAD SW PULSE
9	PB CHROMA
10	REC CHROMA
11	3.58MHz
12	DELAY REC +12V
13	SLPⓈ
14	LP/SLPⓈ
15	GND
16	PB CHROMA (629KHz)
17	GND

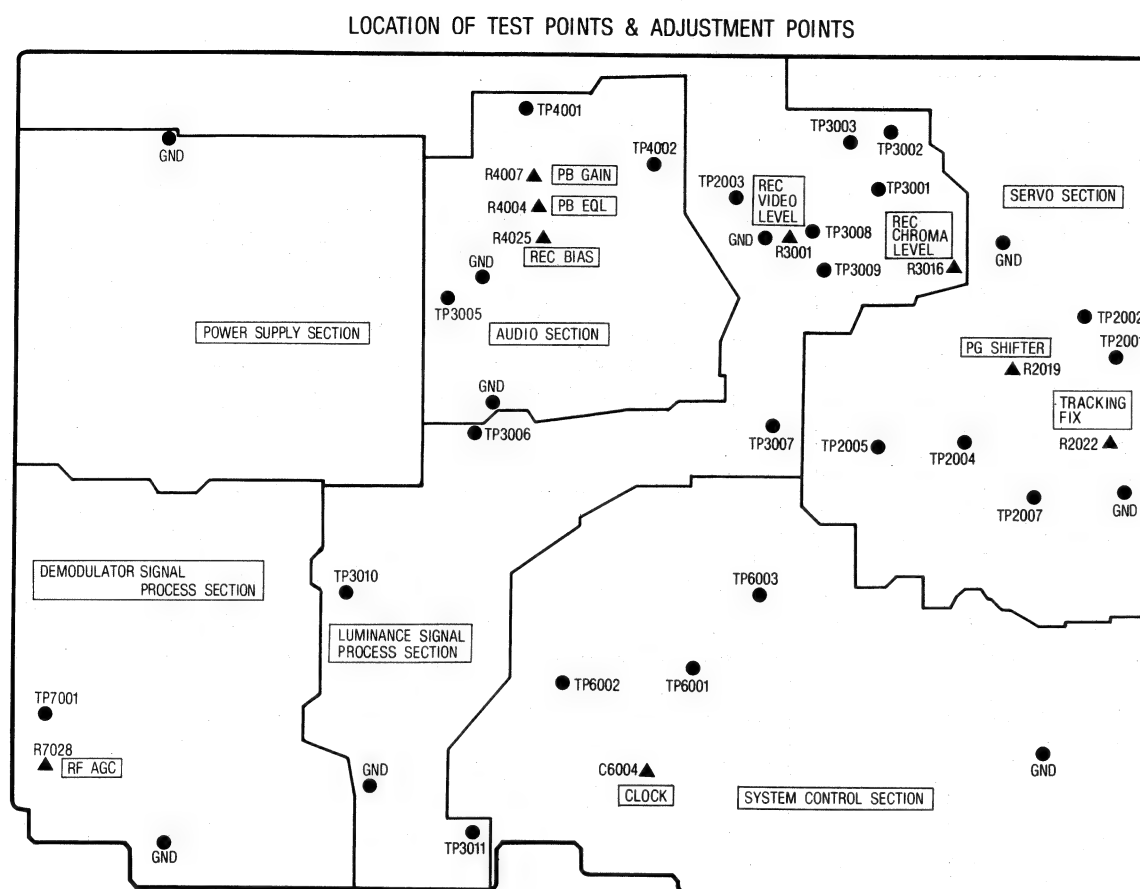
JUMPER (TO LUMINANCE)	
1	GND
2	+5V
3	REC LUMINANCE
4	HSS
5	HEAD SW PULSE
6	VIDEO
7	GND
8	VIDEO
9	ARTIFICIAL V SYNC
10	PB CHROMA
11	EE/VV (EEⓇ)
12	LP/SLPⓇ
13	PB VIDEO
14	DOC DET
15	PICTURE
16	PLAYⓇ
17	GND

1	VIDEO HEAD (L)
2	GND
3	VIDEO HEAD (R)
4	VIDEO HEAD (R) (1)

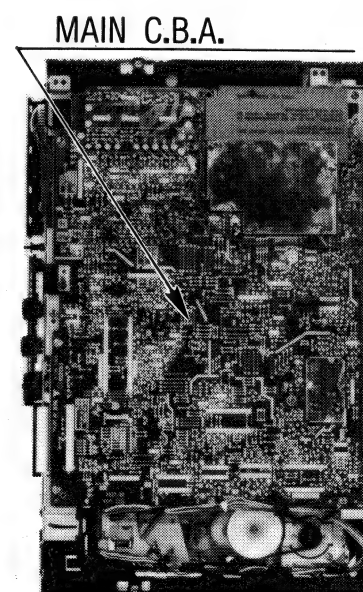
1	GND
2	AUDIO HEAD
3	AUDIO HEAD
4	ERASE HEAD

JUMPER (TO TV DEMODULATOR)	
1	UHF/VHF AGC
2	RF AGC
3	GND
4	IF
5	GND
6	AFT SW
7	GND
8	+12V
9	AFT
10	VIDEO
11	EE/VV (V _{CC})
12	+12V
13	
14	GND
15	AUDIO

P7001	
1	
2	
3	VH
4	U
5	DEFEAT
6	GND
7	UNSWITCH +12V
8	+30V
9	CH LOCK (L)
10	BT
11	AFT SW
12	CH LED

[illegible]

REF.NO.	IC3001																	
MODE	1	2	3	4	5	6	7	8	9									
STOP	0	0	★	0	-0.3	0	-0.3	0	-0.4									
REC	7.3	11.7	★	7.3	2.0	5.5	0.8	5.5	0.8									
PLAY	0	0	★	0	-0.3	0	-0.3	0	-0.4									
CUE	0	0	★	0	-0.5	0	-0.5	0	-0.9									
REV	0	0	★	0	-0.3	0	-0.3	0	-0.3									
REF.NO.	IC3002																	
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14				
STOP	0.1	0	0	0	0	0	0	4.9	0	0	0.1	0.1	0	0.1				
REC	0.1	0	0	0	0	0	5.5	2.4	0	0	0	0.1	0	0				
PLAY	4.7	0.8	0.7	0	0.7	0.8	0	2.5	2.7	2.5	1.7	2.3	0	4.7				
CUE	4.6	0.7	0.7	0	0.7	0.8	0	2.5	2.7	2.4	1.7	2.2	0	4.7				
REV	4.6	0.8	0.7	0	0.7	0.8	0	2.5	2.6	2.4	1.7	2.2	0	4.6				
REF.NO.	IC4001																	
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STOP	11.2	5.4	5.5	5.5	5.5	5.6	0	0	5.5	5.6	5.4	5.5	0.2	5.4	0	5.0	4.6	5.6
REC	11.2	4.8	5.5	0.1	5.6	5.6	0	0	5.6	5.6	5.4	5.6	0.2	5.3	5.0	5.0	4.6	5.6
PLAY	11.1	5.6	5.5	5.5	5.5	5.5	0	0	5.6	5.5	5.3	5.5	0	5.3	5.2	5.2	0	5.6
REF.NO.	IC4002									IC4003								
MODE	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9		
STOP	0	0	0	0	4.2	11.2	0.1	0.1	0.2	0	0.2	0	0.1	0	0	0		
REC	0	0	0	0	4.2	11.2	0.1	0.1	0.3	0	0.3	0	0.1	0	0	0.8		
PLAY	0	0	0	0	0.3	11.1	4.7	0.1	0.2	0	0.4	0	0.1	0	0	0		
REF.NO.	TP3001	TP3002	TP3003	TP3005	TP3006	TP3007	TP3008	TP3009	TP3010	TP3011	TP4001	TP4002						
MODE																		
STOP	0	0	0	0	0	4.9	1.0	1.1	0	5.0	0	0						
REC	5.5	0	0	0	0	0	1.0	1.0	0	5.0	0	0						
PLAY	0	0	0	0	2.7	2.5	1.1	1.2	0	5.0	0	0						
CUE	0	0	0	0	2.7	2.5	1.1	1.2	0	4.9								
REV	0	0	0	0	2.7	2.5	1.1	1.2	0	5.0								



LUMINANCE SIGNAL PROCESS SECTION
VOLTAGE MEASUREMENT:

1. CUE, REVIEW.
COLOR BAR SIGNAL IN SLP MODE.
2. OTHERS
COLOR BAR SIGNAL IN SP MODE.

★ : UNMEASURABLE OR UNNECESSARY
TO MEASURE.

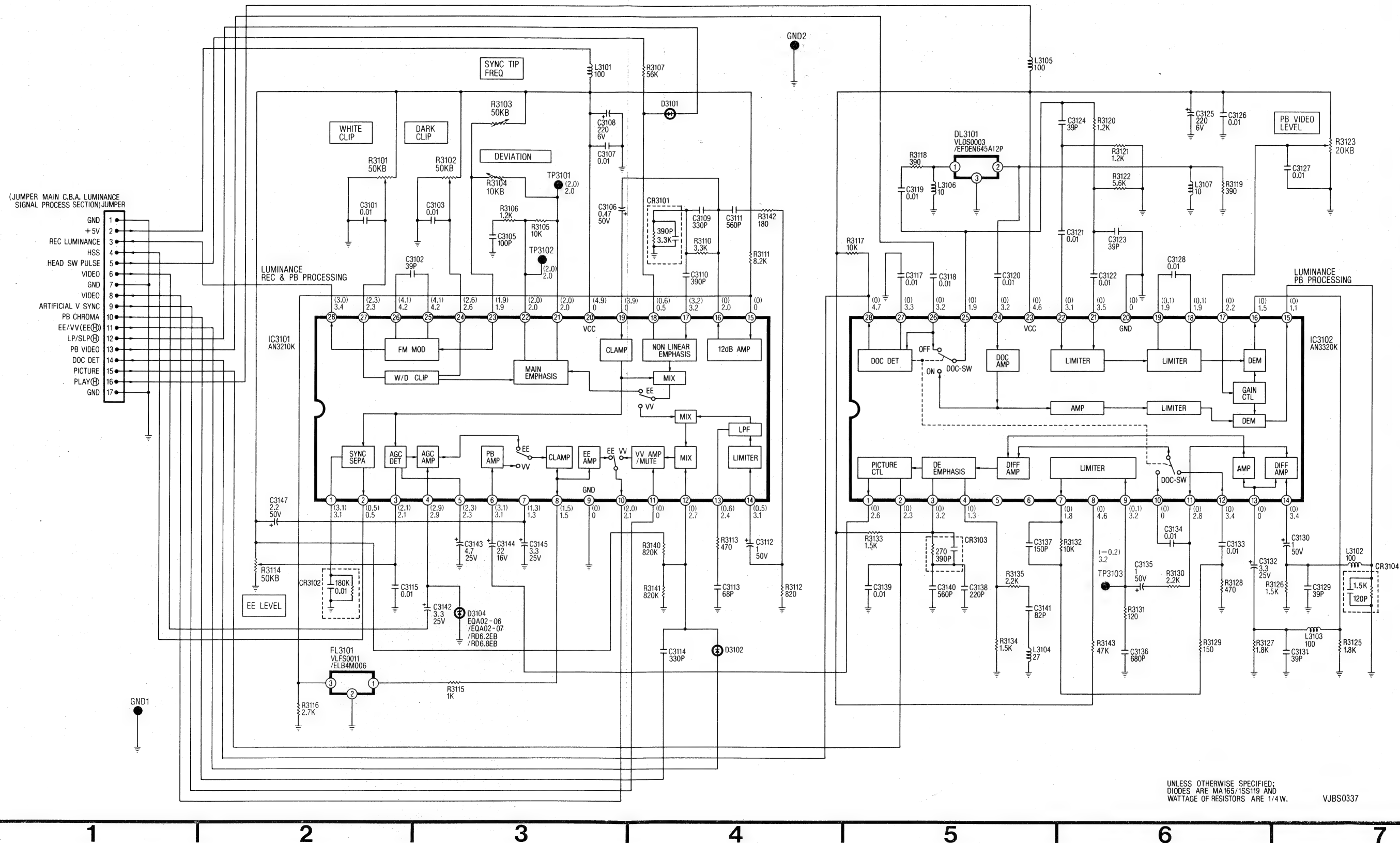
AUDIO SECTION
VOLTAGE MEASUREMENT:
1. CUE, REVIEW.
MONO SCOPE SIGNAL IN SLP MODE.
2. OTHERS
MONO SCOPE SIGNAL IN SP MODE.

LUMINANCE SCHEMATIC DIAGRAM

CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

VOLTAGE MEASUREMENT:
 COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
 COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE (ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

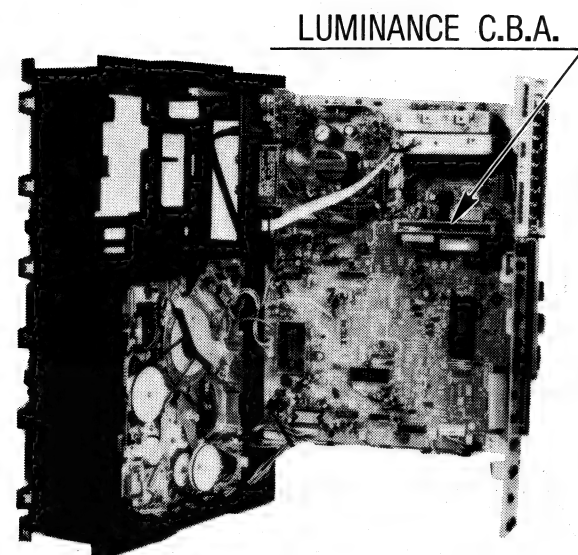
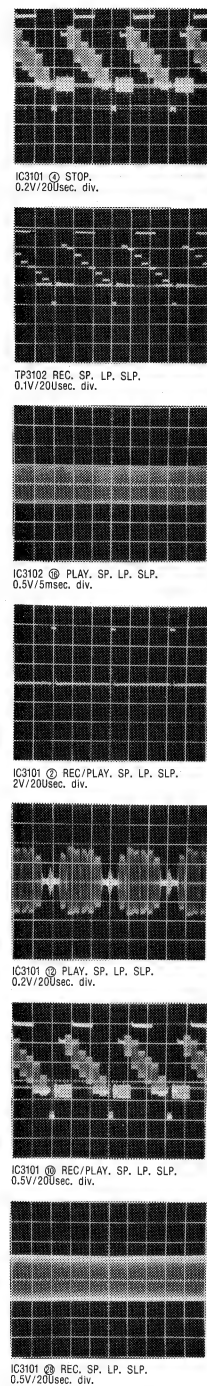
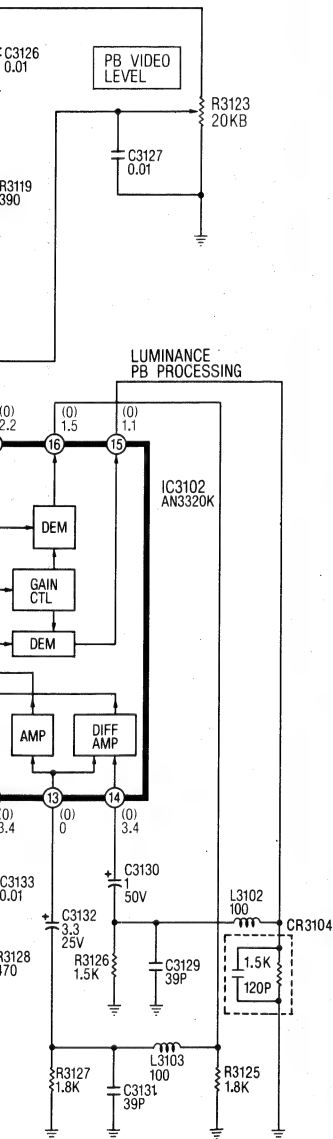


NOTE: REF. NC
EXAMP
SC
(R3102

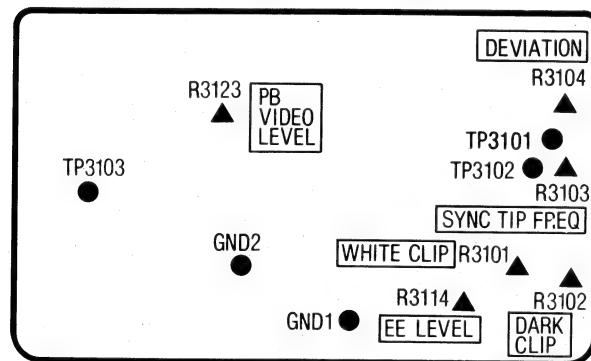
UNLESS OTHERWISE SPECIFIED;
DIODES ARE MA165/1SS119 AND
WATTAGE OF RESISTORS ARE 1/4 W.

VJBS0337

VICES ARE
ECIAL
LY SENSITIVE



LOCATIONS OF TEST POINTS & ADJUSTMENT POINTS



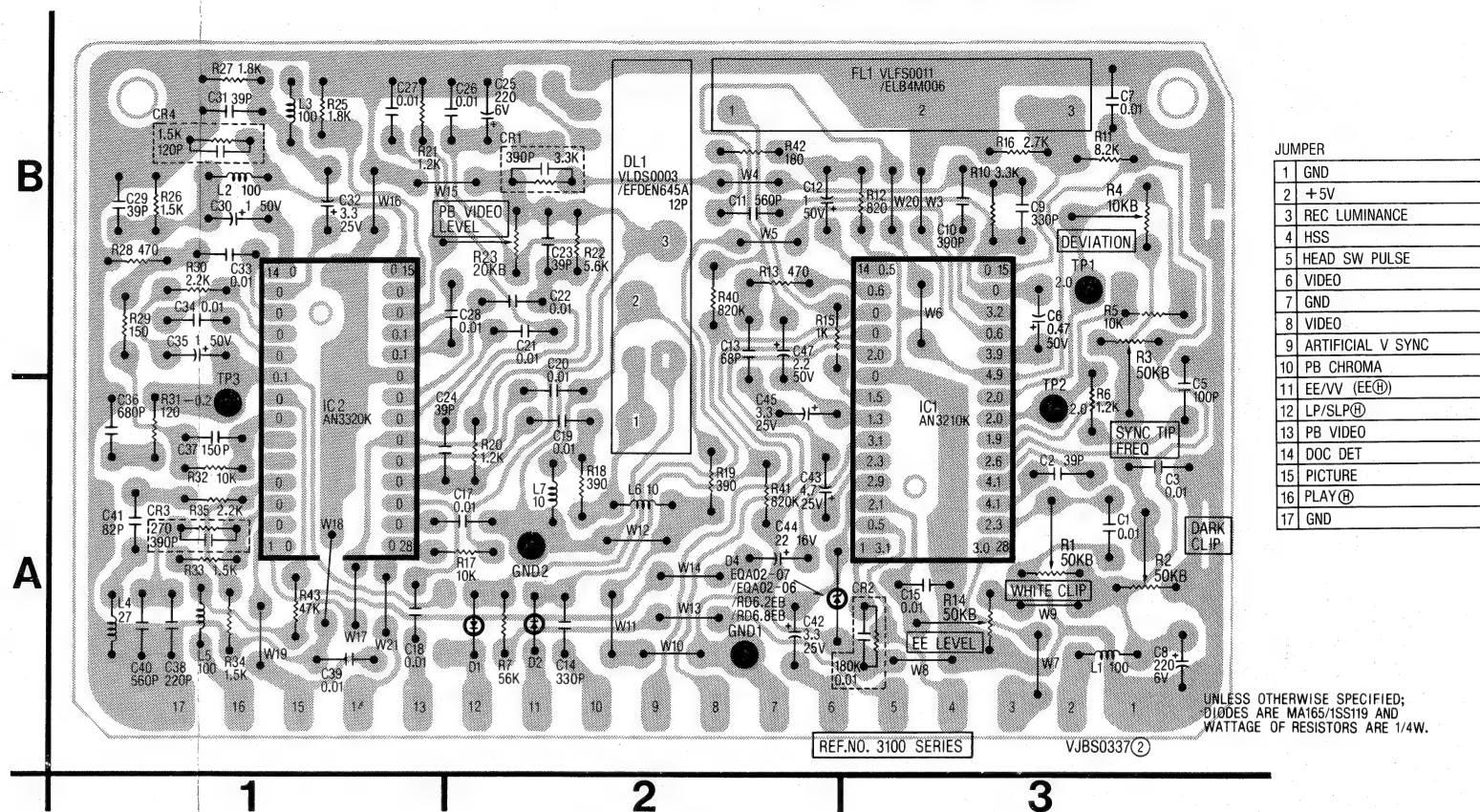
VOLTAGE MEASUREMENT:
1. CUE, REVIEW.
COLOR BAR SIGNAL IN SLP MODE.
2. OTHERS
COLOR BAR SIGNAL IN SP MODE.
★ : UNMEASURABLE OR UNNECESSARY TO MEASURE.

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 3100 SERIES
SCHEMATIC DIAGRAM---R3102
(R3102 IS ABBREVIATED TO R2)

LUMINANCE C.B.A. VEPS0337A

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN SP REC MODE.

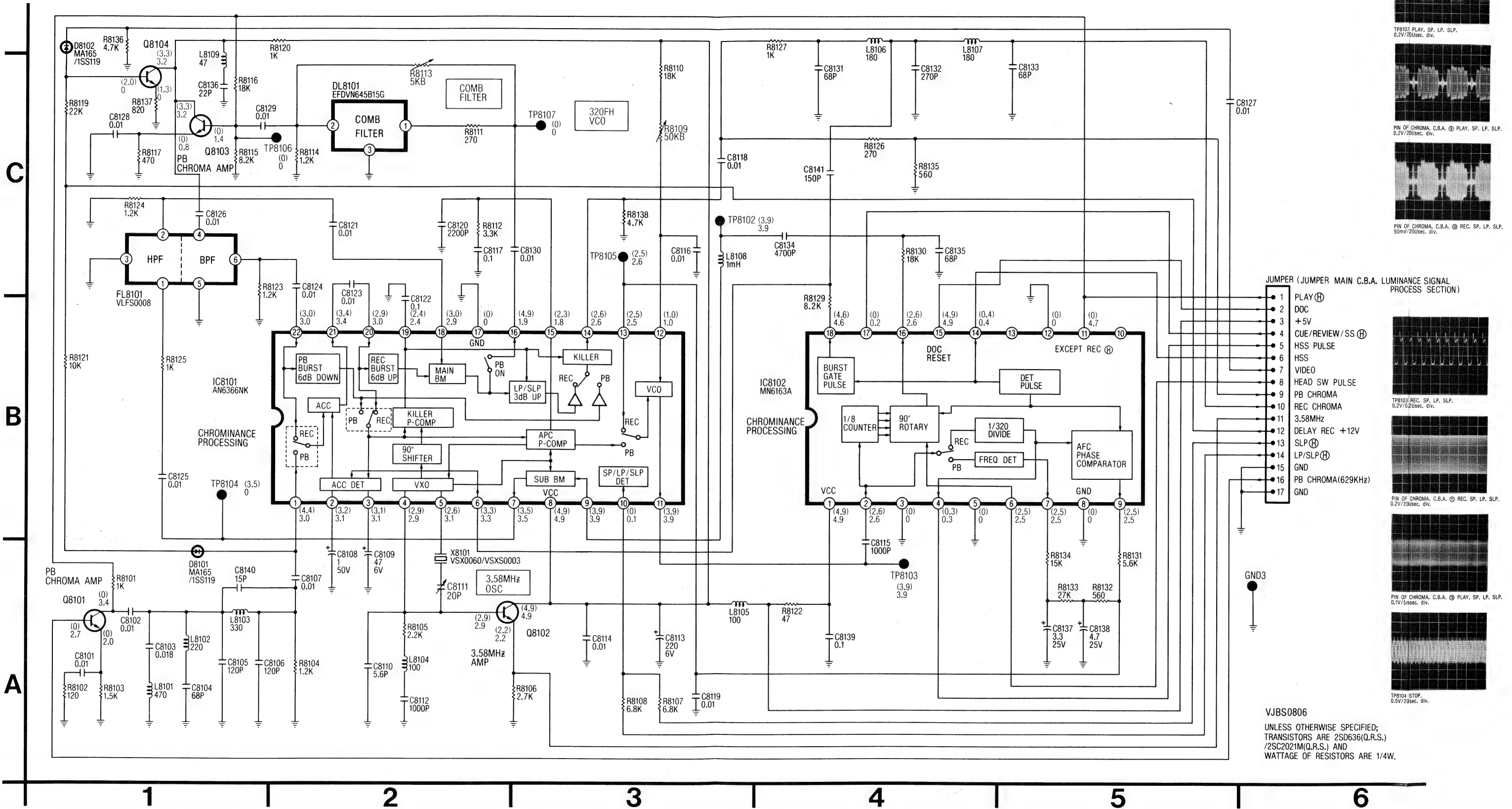
CAUTION:DO NOT BEND OR SPREAD APART THE LUMINANCE AND CHROMINANCE PACKS.
BY DOING SO DAMAGE TO THE MAIN C.B.A. OR PINS ON THE PACKS MAY RESULT.



CHROMINANCE SCHEMATIC DIAGRAM

VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.

CALLOUTS NEXT TO WIRING PLUGS INDICATE
CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

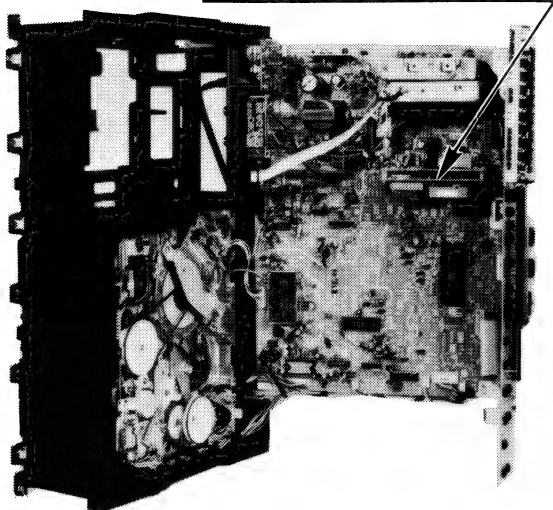


CHROMINANCE C.B.A. VEPS0806A

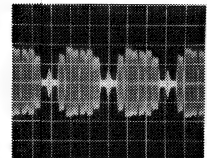
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN SP REC MODE.

CAUTION: DO NOT BEND OR SPREAD APART THE LUMINANCE AND CHROMINANCE PACKS.
BY DOING SO DAMAGE TO THE MAIN C.B.A. OR PINS ON THE PACKS MAY RESULT.

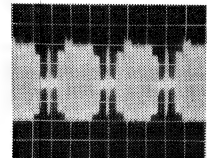
CHROMINANCE C.B.A.



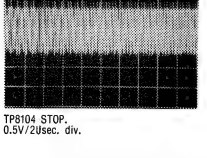
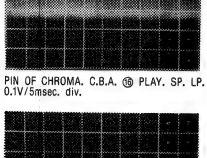
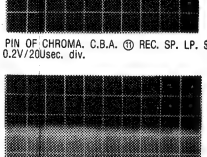
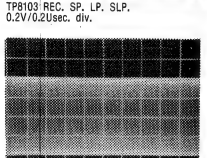
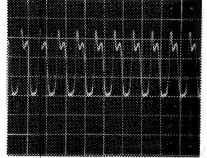
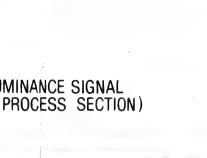
TP8107 PLAY, SP, LP, SLP,
0.2V/20usec. div.



PIN OF CHROMA, C.B.A. @ PLAY, SP, LP, SLP,
0.2V/20usec. div.



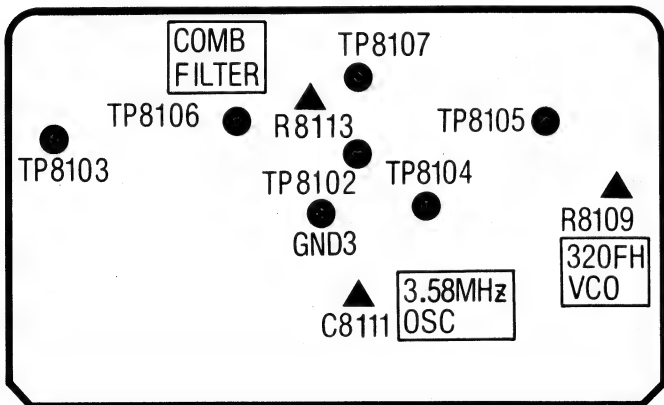
PIN OF CHROMA, C.B.A. @ REC, SP, LP, SLP,
50mV/20usec. div.



JUMPER (JUMPER MAIN C.B.A. LUMINANCE SIGNAL
PROCESS SECTION)

- 1 PLAY ⊕
- 2 DOC
- 3 +5V
- 4 CUE/REVIEW/SS ⊕
- 5 HSS PULSE
- 6 HSS
- 7 VIDEO
- 8 HEAD SW PULSE
- 9 PB CHROMA
- 10 REC CHROMA
- 11 3.58MHz
- 12 DELAY REC +12V
- 13 SLP ⊕
- 14 LP/SLP ⊕
- 15 GND
- 16 PB CHROMA (629KHz)
- 17 GND

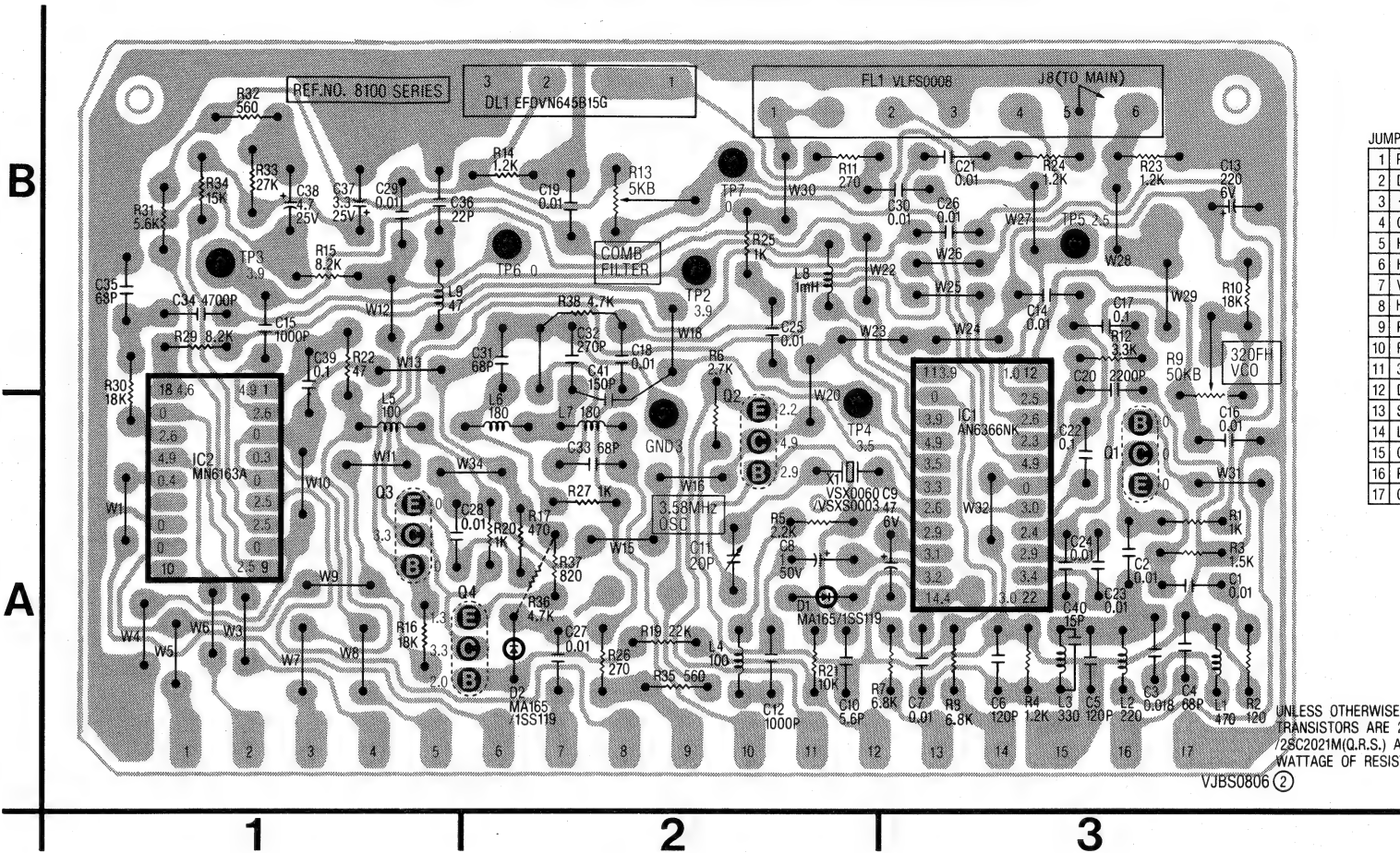
LOCATIONS OF TEST POINTS & ADJUSTMENT POINTS



SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A. ...R2, REF. NO. 8100 SERIES
SCHEMATIC DIAGRAM ...R8102
(R8102 IS ABBREVIATED TO R2)

VOLTAGE MEASUREMENT:
1. CUE, REVIEW,
COLOR BAR SIGNAL IN SLP MODE.
2. OTHERS
COLOR BAR SIGNAL IN SP MODE.
★ : UNMEASURABLE OR UNNECESSARY
TO MEASURE.



JUMPER	
1	PLAY ⊕
2	DOC
3	+5V
4	CUE/REVIEW/SS ⊕
5	HSS PULSE
6	HSS
7	VIDEO
8	HEAD SW PULSE
9	PB CHROMA
10	REC CHROMA
11	3.58MHz
12	DELAY REC +12V
13	SLP ⊕
14	LP/SLP ⊕
15	GND
16	PB CHROMA (629KHz)
17	GND

UNLESS OTHERWISE SPECIFIED;
TRANSISTORS ARE 2SD636(Q.R.S.)
/2SC2021M(Q.R.S.) AND
WATTAGE OF RESISTORS ARE 1/4W.

REF.NO.	Q8101			Q8102			Q8103			Q8104								
MODE	E	B	C	E	B	C	E	B	C	E	B	C						
STOP	0	0	0	2.3	2.9	4.9	0	0	4.9	0	0	4.9						
REC	0	0	0	2.2	2.9	4.9	0	0	3.3	1.3	2.0	3.3						
PLAY	2.0	2.7	3.4	2.2	2.9	4.9	0.8	1.4	3.2	0	0	3.2						
CUE	1.9	2.6	3.4	2.2	2.9	4.9	0.8	1.4	3.2	0	0	3.2						
REV	2.0	2.7	3.4	2.2	2.9	4.8	0.7	1.4	3.2	0	0	3.2						

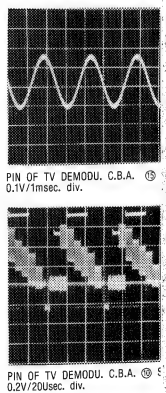
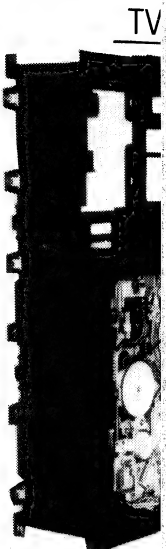
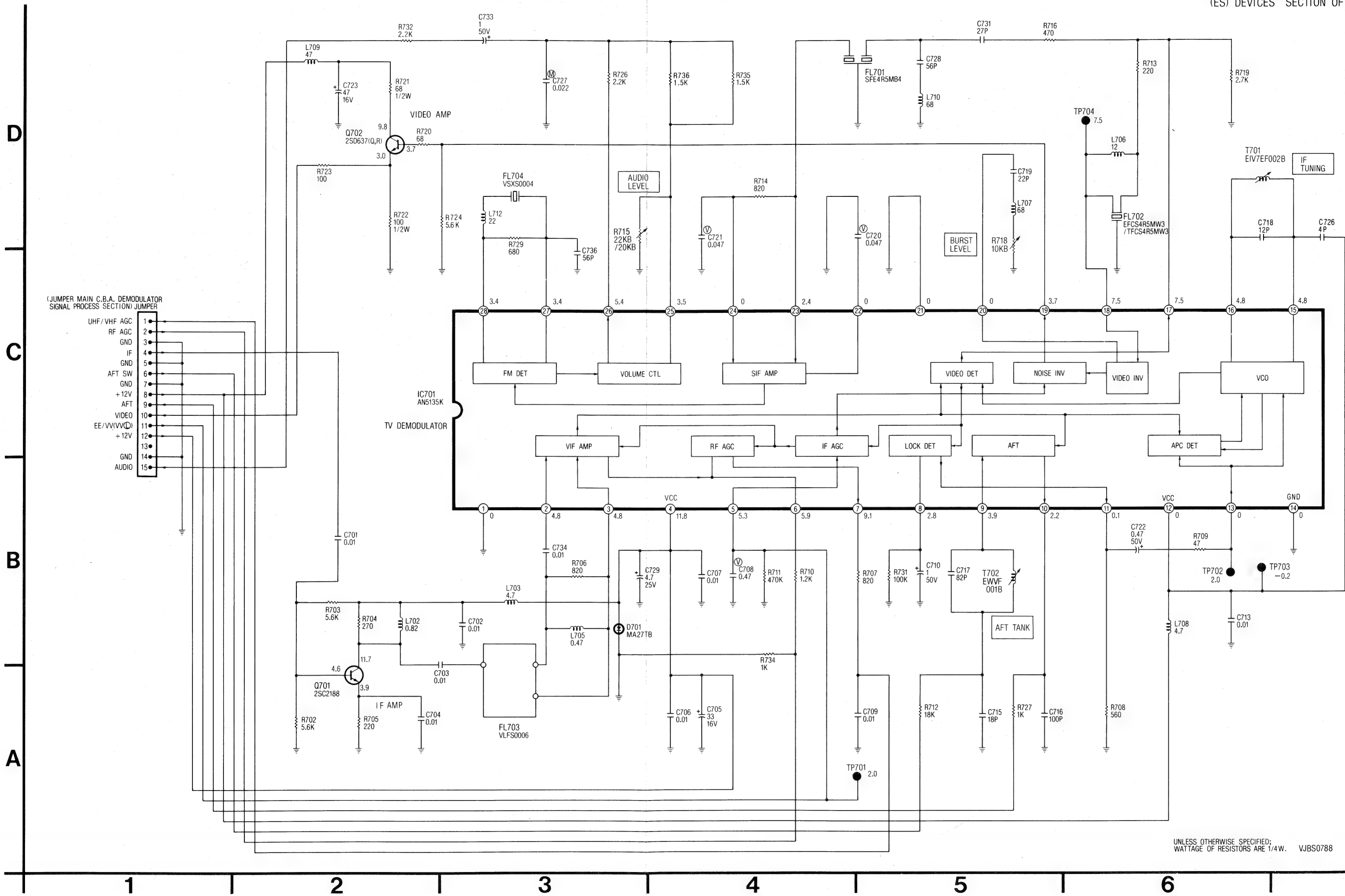
REF.NO.	IC8101																							
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
STOP	3.0	2.9	3.1	2.9	3.1	3.3	3.5	4.9	3.9	2.9	3.9	1.0	2.5	0	1.8	1.9	0	2.9	2.9	2.9				
REC	4.4	3.2	3.1	2.9	2.6	3.3	3.5	4.9	3.9	0	3.9	1.0	2.5	2.6	2.3	4.9	0	3.0	2.4	2.9				
PLAY	3.0	3.1	3.1	2.9	3.1	3.3	3.5	4.9	3.9	0.1	3.9	1.0	2.5	2.6	1.8	1.9	0	2.9	2.4	3.0				
CUE	2.9	3.1	3.1	2.9	3.1	3.3	3.5	4.9	3.9	3.0	3.9	0.7	2.5	2.6	1.8	1.9	0	2.9	2.5	3.0				
REV	2.9	3.1	3.1	2.9	3.1	3.3	3.5	4.9	3.9	2.9	3.9	0.9	2.5	2.6	1.8	1.9	0	2.9	2.5	3.0				
REF.NO.	IC8101										IC8102													
MODE	21	22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
STOP	3.3	3.0	4.9	2.6	0	0.3	0	0	2.5	0	2.5	★	0	0	★	0.5	4.9	2.5	0	4.6				
REC	3.4	3.0	4.9	2.6	0	0.3	0	2.5	2.5	0	2.5	★	0	0	★	0.4	4.9	2.6	0	4.6				
PLAY	3.4	3.0	4.9	2.6	0	0.3	0	2.5	2.5	0	2.5	★	4.7	0	★	0.4	4.9	2.6	0.2	4.6				
CUE	3.4	3.0	4.9	2.6	0	0.3	0	2.5	2.5	0	2.5	★	4.7	0	★	0.5	4.9	2.6	3.9	4.6				
REV	3.4	3.0	4.9	2.6	0	0.3	0	2.5	2.5	0	2.5	★	4.7	0	★	0.4	4.9	2.5	3.9	4.6				
REF.NO.	TP8102						TP8105						TP8106						TP8107					
MODE	21	22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
STOP	4.0	4.0	3.5	2.6	0	0																		
REC	3.9	3.9	3.5	2.5	0	0																		
PLAY	3.9	3.9	0	2.6	0	0																		
CUE	3.9	3.9	3.4	2.5	0	0																		
REV	3.9	3.9	3.5	2.5	0	0																		

TV DEMODULATOR SCHEMATIC DIAGRAM

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.

CALLOUTS NEXT TO WIRING PLUGS INDICATE
CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPI
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICAL
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.



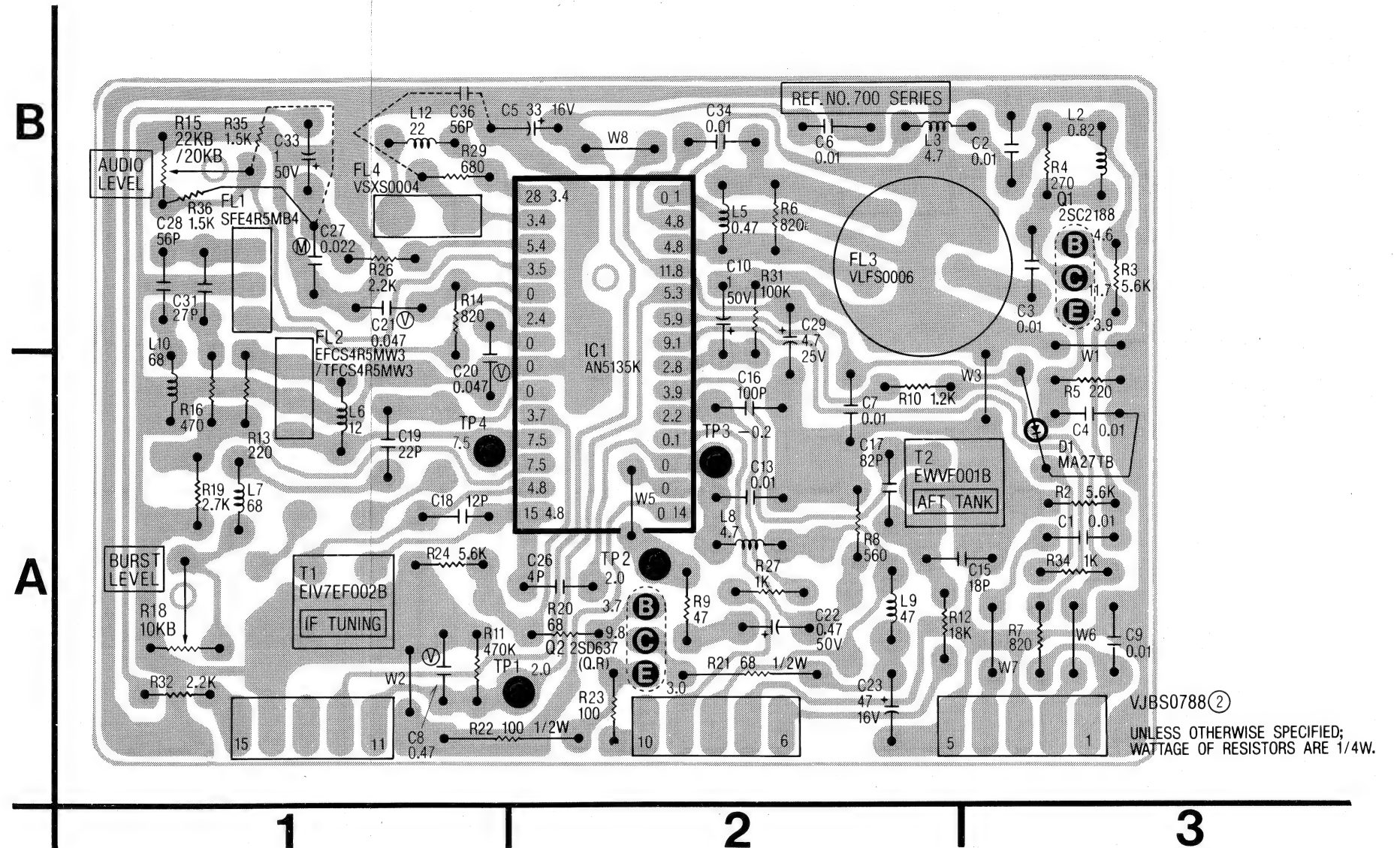
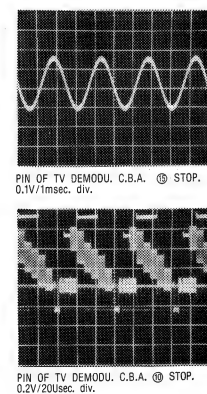
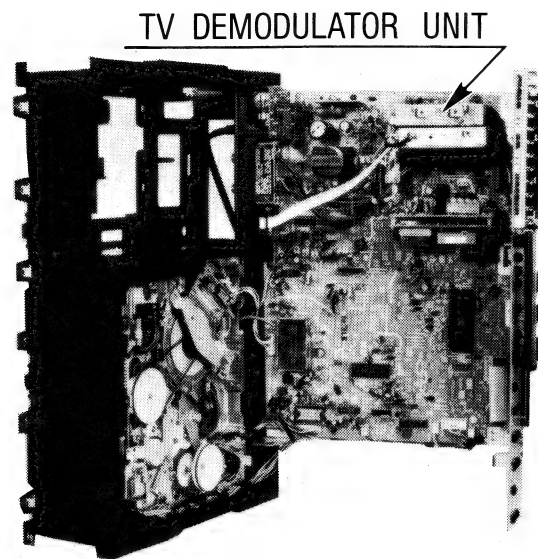
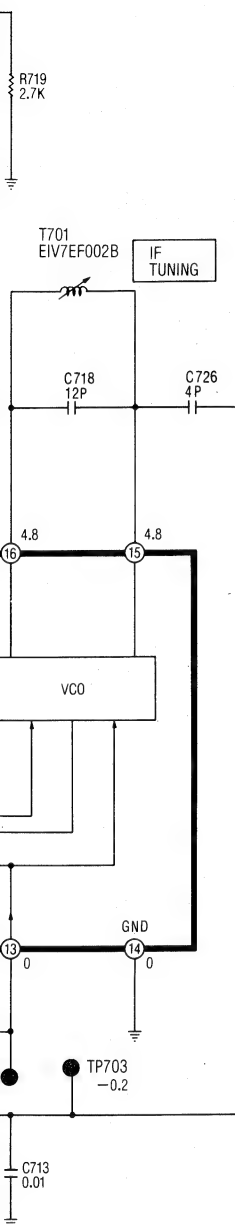
UNLESS OTHERWISE SPECIFIED;
WATTAGE OF RESISTORS ARE 1/4W. VJBS0788

NOTE : REF. NO. ON C.B.A.
EXAMPLE: C.B.A...
SCHEMATIC DIA
(R702 IS ABBREVI

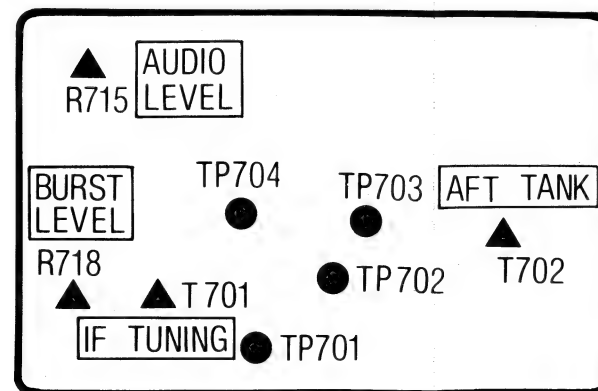
SPECIAL NOTE:
INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
DEVICES" SECTION OF THIS SERVICE MANUAL.

TV DEMODULATOR UNIT VEQS0257

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.



LOCATIONS OF TEST POINTS & ADJUSTMENT POINTS



JUMPER

1	UHF/VHF AGC
2	RF AGC
3	GND
4	IF
5	GND
6	AFT SW
7	GND
8	+12V
9	AFT
10	VIDEO
11	EE/VV(VVⓈ)
12	+12V
13	
14	GND
15	AUDIO

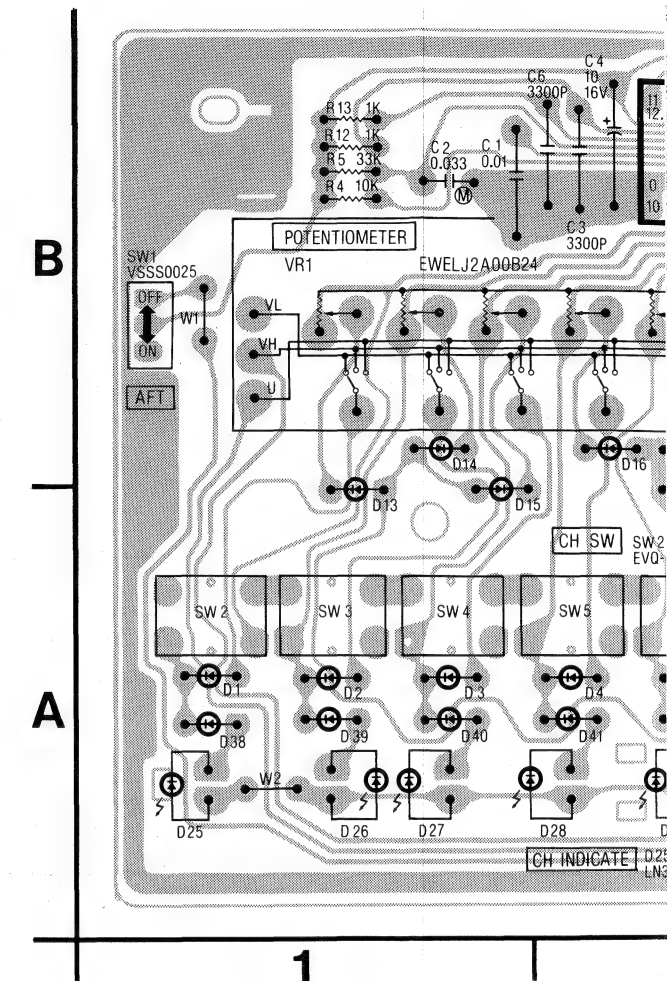
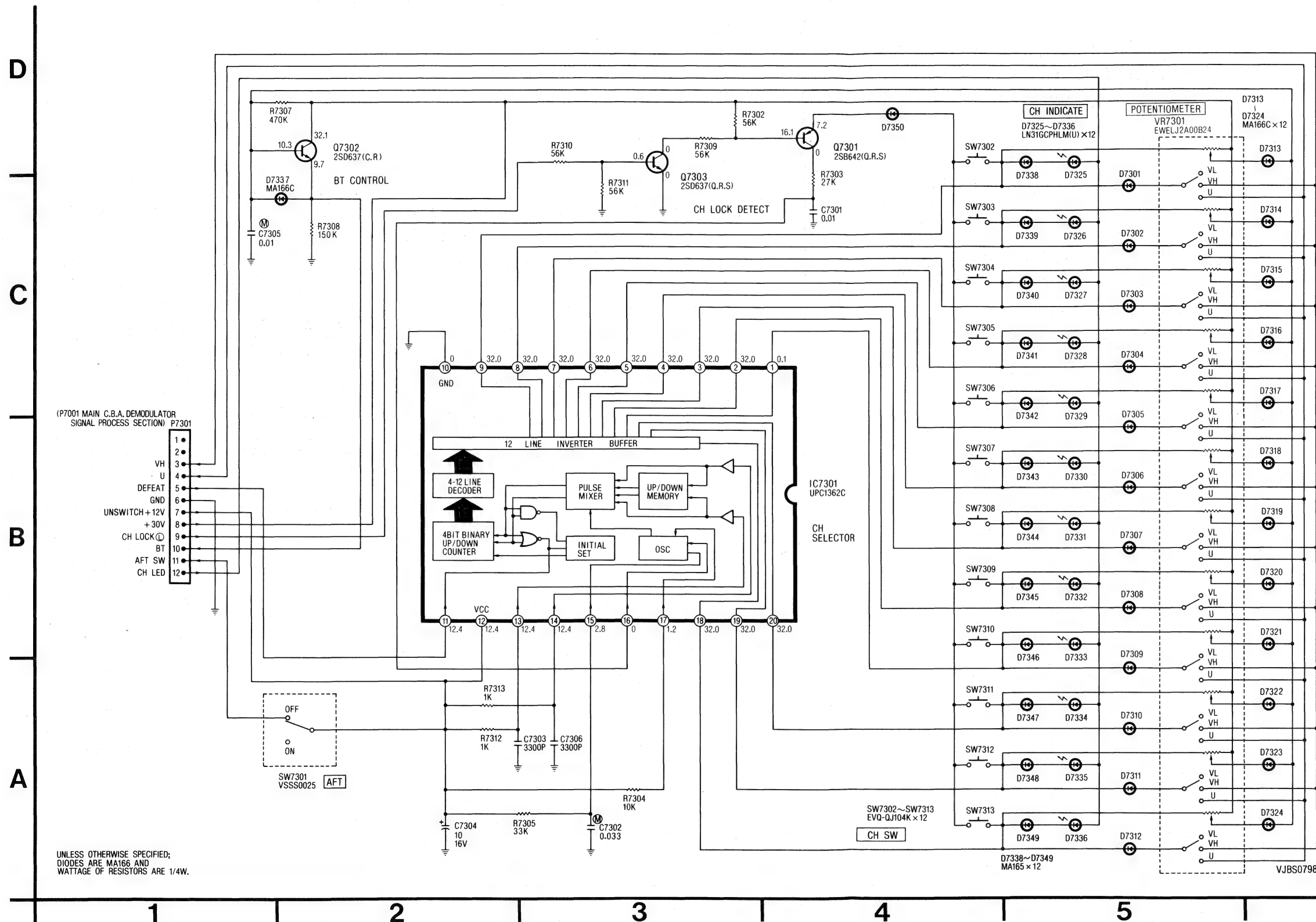
NOTE : REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF.NO. 700 SERIES
SCHEMATIC DIAGRAM---R702
(R702 IS ABBREVIATED TO R2)

CHANNEL SELECT SCHEMATIC DIAGRAM

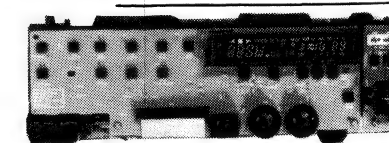
VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

CHANNEL SELECT C.B.A. V
V



CHANNEL SELECT



NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A. ...R2, REF. NO. 7300 SERIES
SCHEMATIC DIAGRAM...R7302
(R7302 IS ABBREVIATED TO R2)

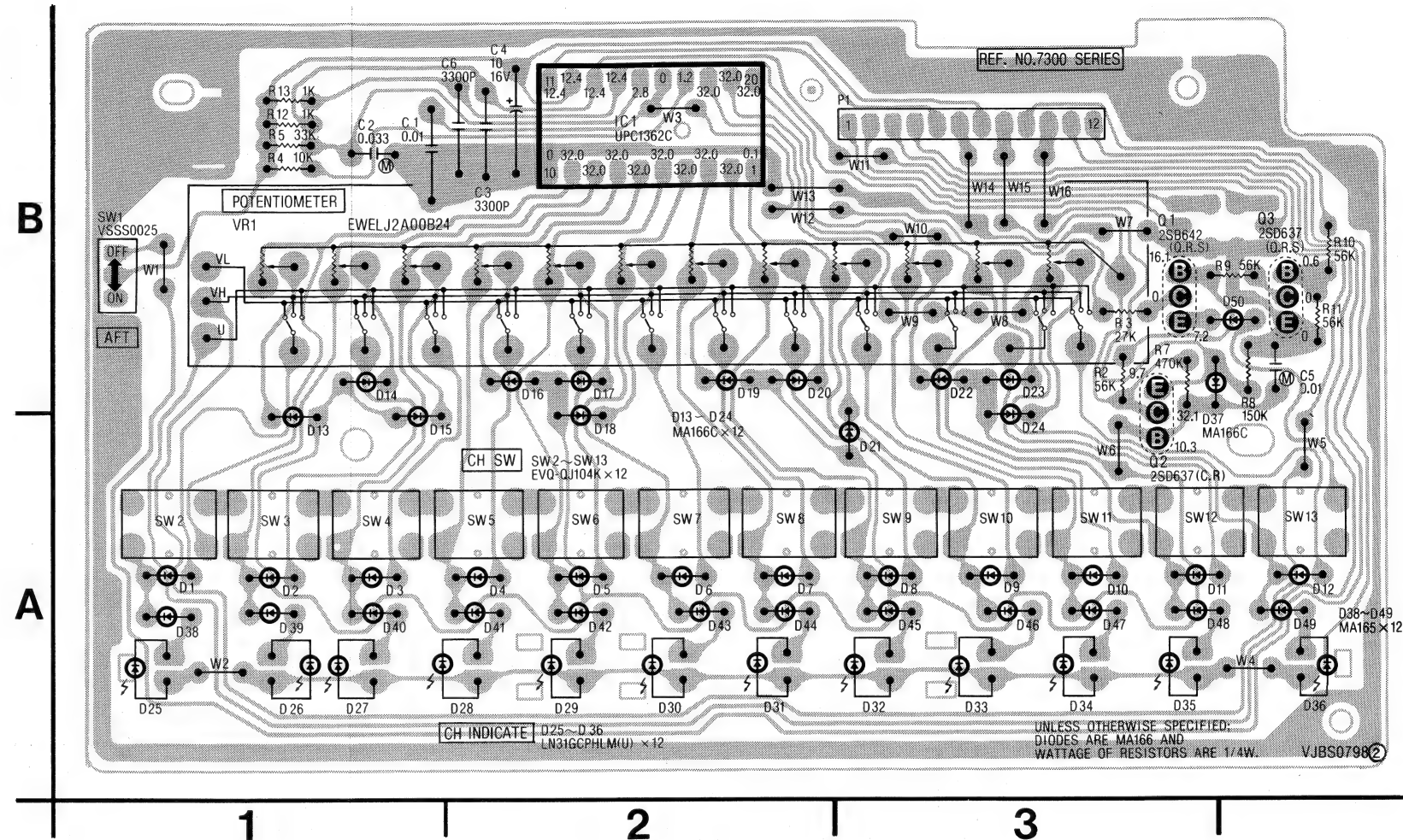
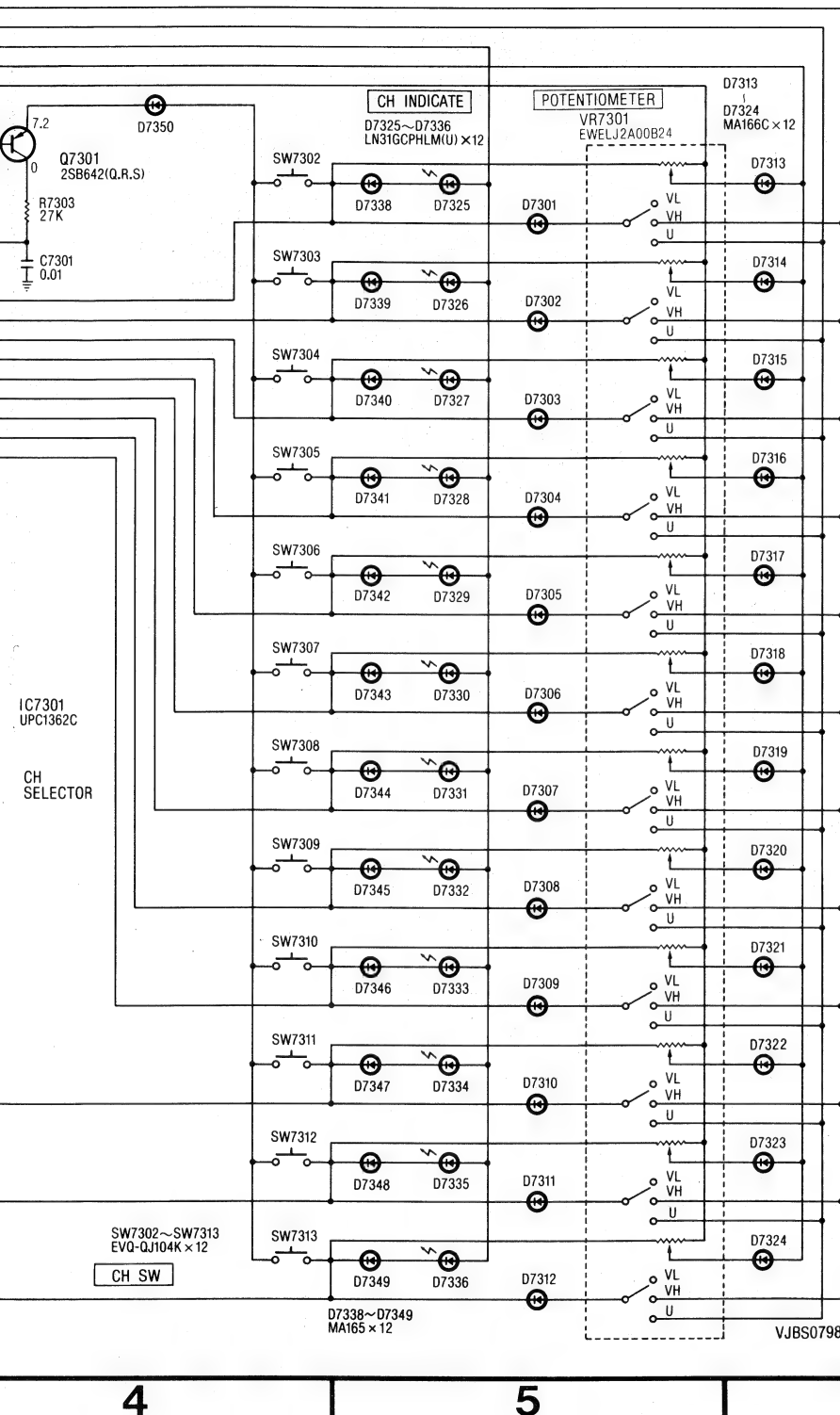
CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.

COLOR BAR SIGNAL
IN STOP MODE.

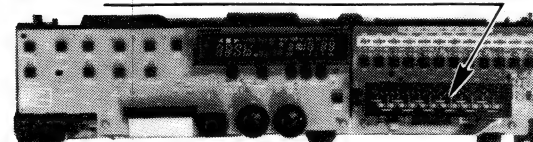
SPECIAL NOTE:
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ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

CHANNEL SELECT C.B.A. VEPS0798A (PV-1222) VEPS0798B (PV-1230,PV-1225)

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL
IN STOP MODE.



CHANNEL SELECT C.B.A.



P7301	
1	
2	
3	VH
4	U
5	DEFEAT
6	GND
7	UNSWITCH +12V
8	+30V
9	CH LOCK
10	BT
11	AFT SW
12	CH LED

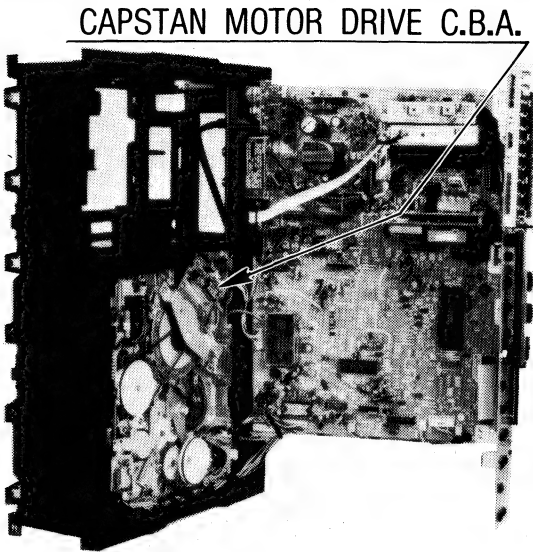
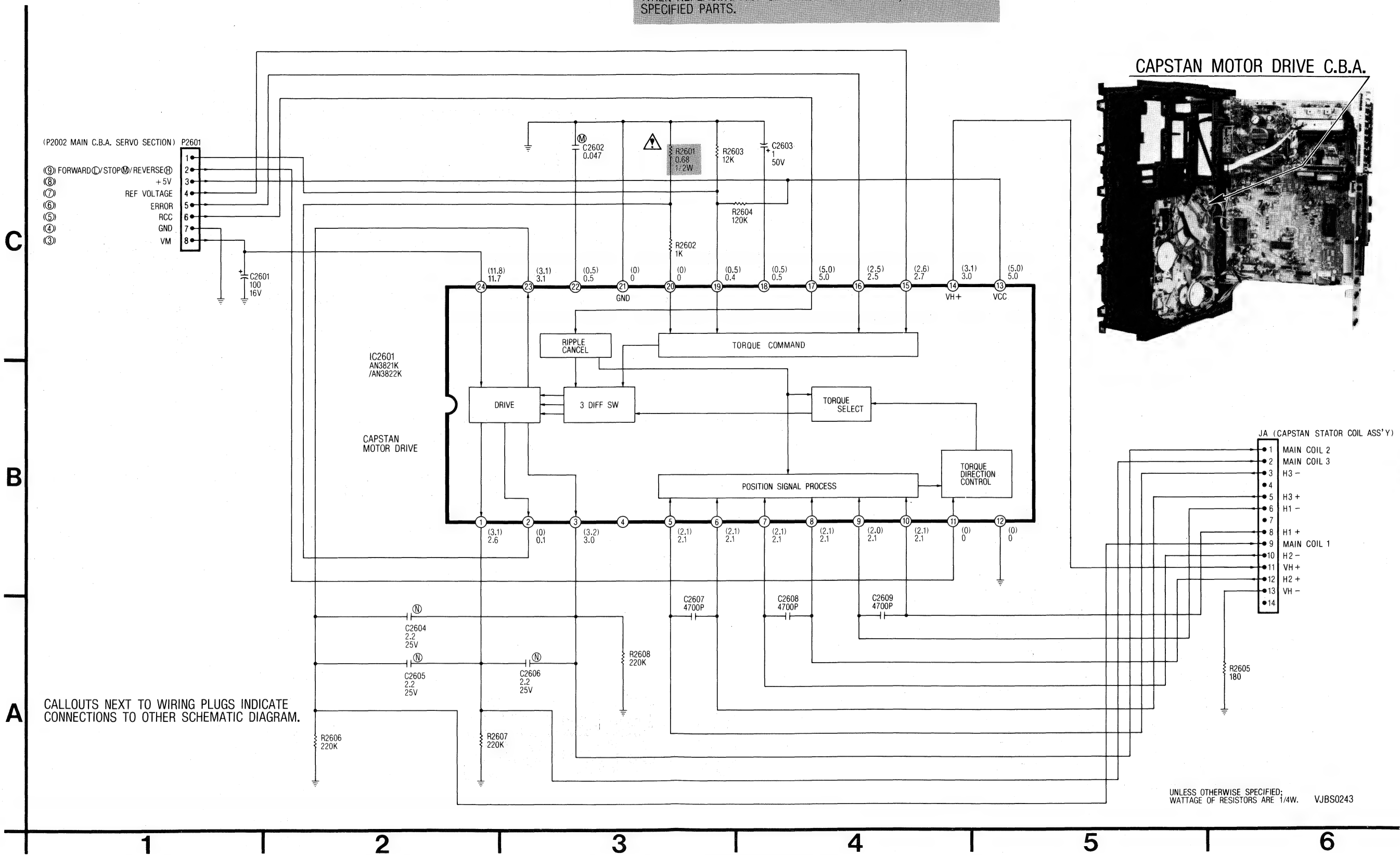
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A. R2, REF. NO. 7300 SERIES
SCHEMATIC DIAGRAM R7302
(R7302 IS ABBREVIATED TO R2)

OUTS NEXT TO WIRING PLUGS INDICATE
CTIONS TO OTHER SCHEMATIC DIAGRAM.

CAPSTAN MOTOR DRIVE SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN ⚠ HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.



CALLOUTS NEXT TO WIRING PLUGS INDICATE CONNECTIONS TO OTHER SCHEMATIC DIAGRAM.


NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 2600 SERIES
SCHEMATIC DIAGRAM---R2602
(R2602 IS ABBREVIATED TO R2)

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE (ES) DEVICES" SECTION OF THIS SERVICE MANUAL.

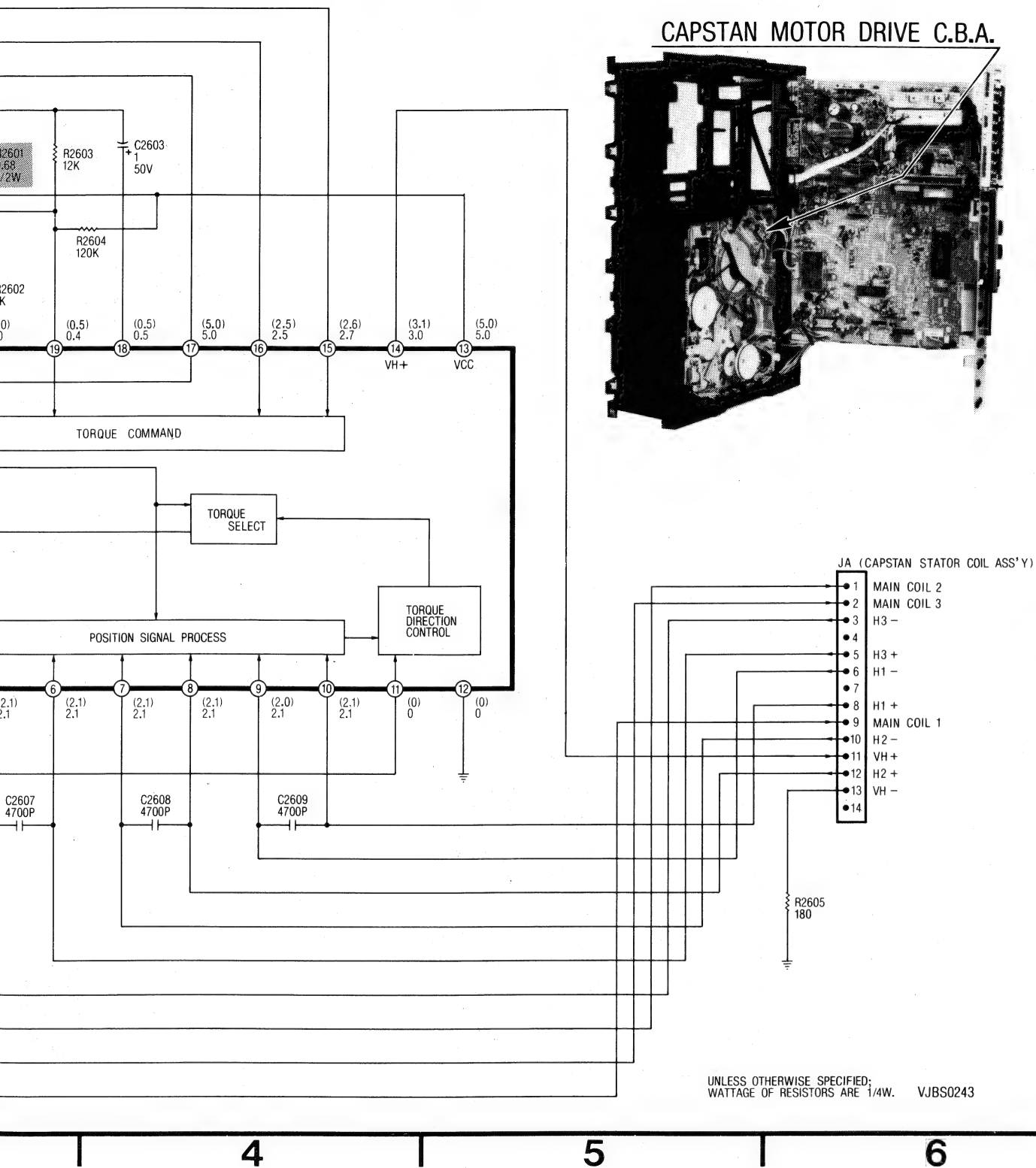
UNLESS OTHERWISE SPECIFIED:
WATTAGE OF RESISTORS ARE 1/4W. VJBS0243

VOLTAGE
1. CU
C
2. OT
C
★ : U

REF.NO.	MODE
STOP	REC
PLAY	CUE
REV	F.ADV.
SLOW(1/2)	REF.NO.
MODE	REF.NO.
STOP	REC
PLAY	CUE
REV	F.ADV.
SLOW(1/2)	REF.NO.

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VOLTAGE MEASUREMENT:
COLOR BAR SIGNAL IN SP REC MODE WITH BRACKET.
COLOR BAR SIGNAL IN SP PLAY MODE WITHOUT BRACKET.




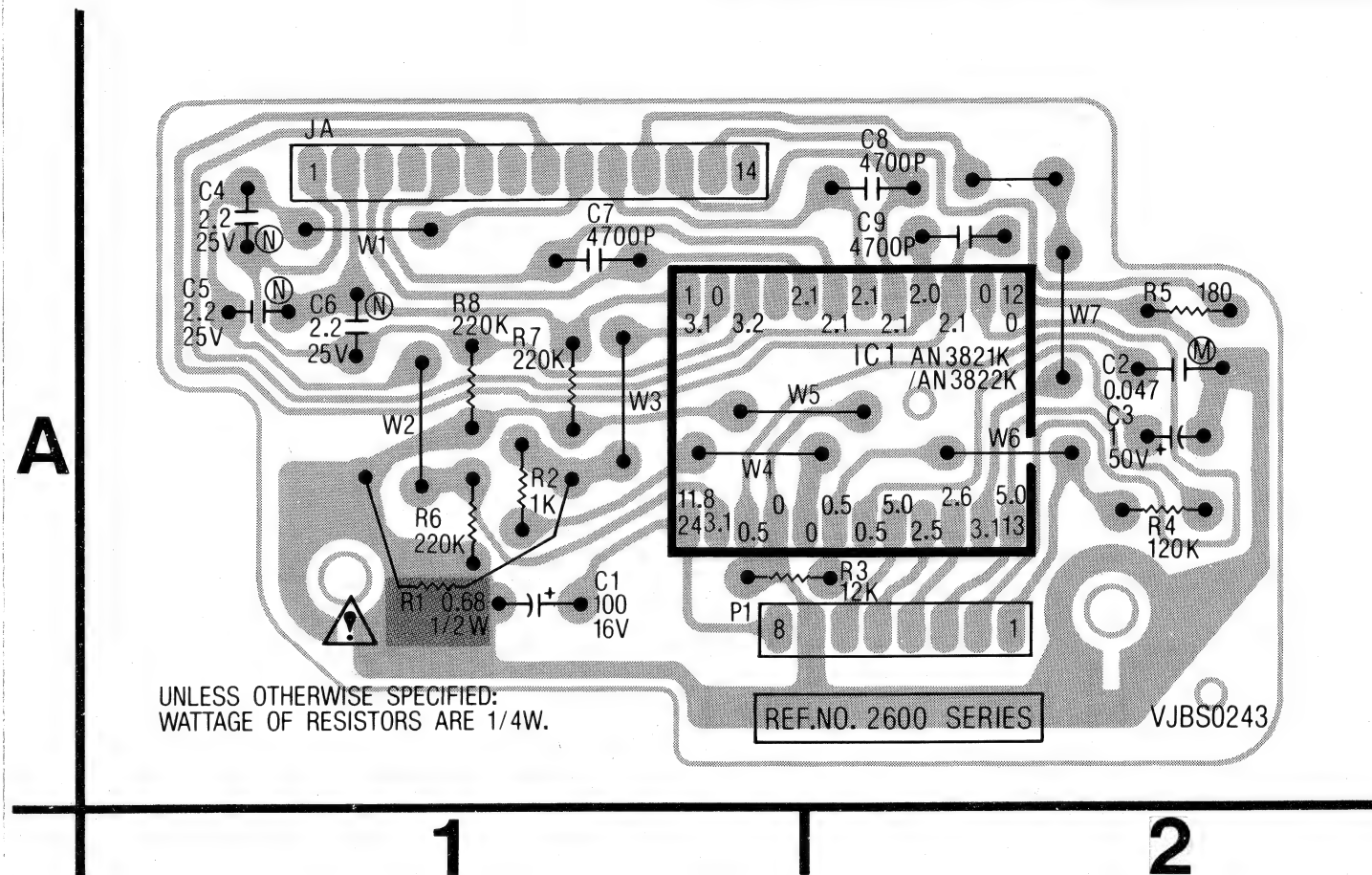
E: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A.---R2, REF. NO. 2600 SERIES
SCHEMATIC DIAGRAM---R2602
(R2602 IS ABBREVIATED TO R2)

SPECIAL NOTE:
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CAPSTAN MOTOR DRIVE C.B.A. VEPS0243A1

VOLTAGE MEASUREMENT: COLOR BAR SIGNAL IN SP REC MODE.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.



VOLTAGE MEASUREMENT:

1. CUE, REVIEW.
COLOR BAR SIGNAL IN SLP MODE.
 2. OTHERS
COLOR BAR SIGNAL IN SP MODE.
- ★ : UNMEASURABLE OR UNNECESSARY TO MEASURE.

P2601

1	FORWARD/STOP/REVERSE
2	+5V
3	REF VOLTAGE
4	ERROR
5	RCC
6	GND
7	VM

P2602

1	MAIN COIL 2
2	MAIN COIL 3
3	H3 -
4	H3 +
5	H1 -
6	H1 +
7	H2 -
8	H2 +
9	MAIN COIL 1
10	VH +
11	H2 -
12	H2 +
13	VH -
14	

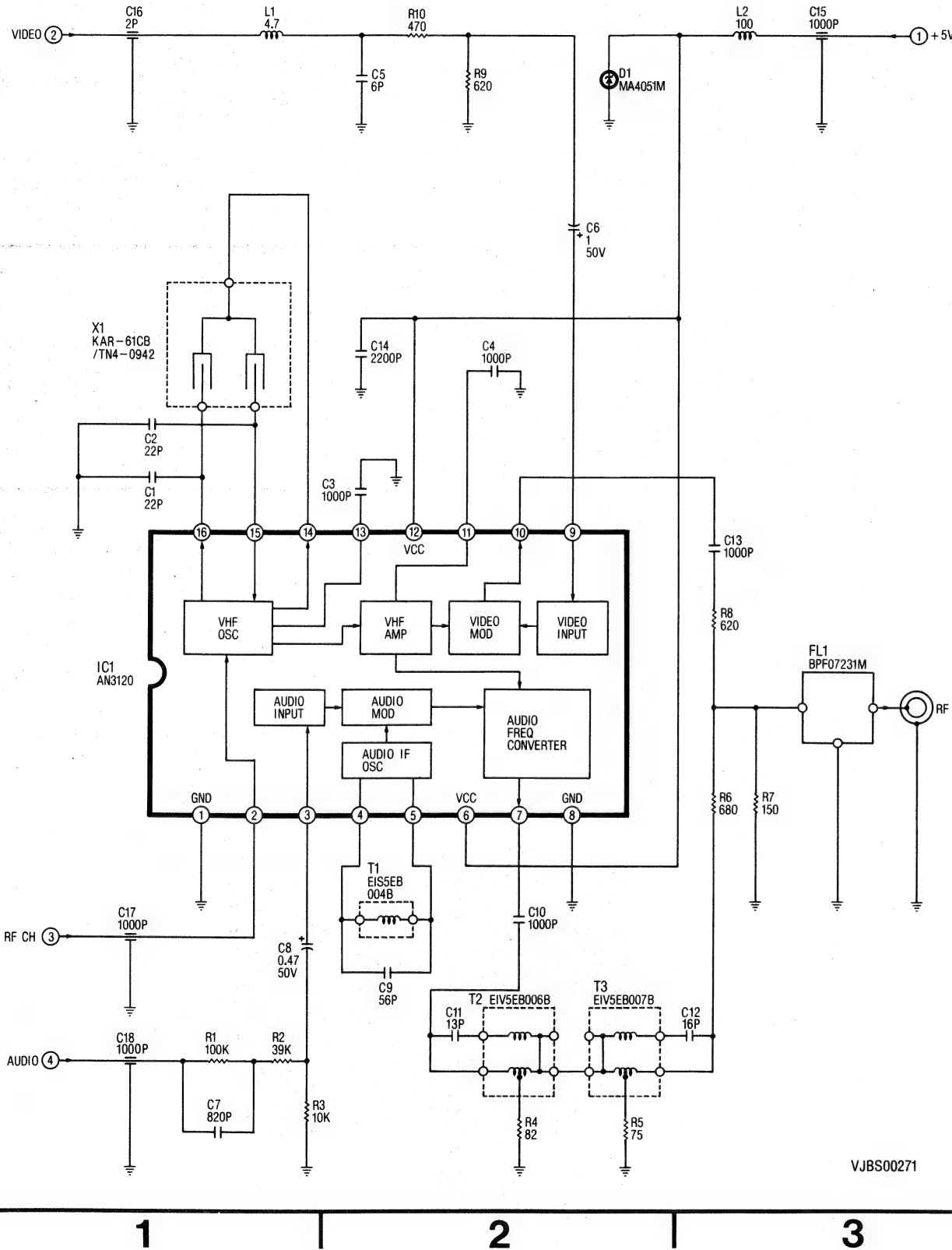
REF.NO.	IC2601																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	2.0	0	2.0	★	2.0	2.1	2.1	2.0	2.0	2.1	2.1	0	4.9	3.0	2.6	2.2	5.0	0.6	0.5	0
REC	3.1	0	3.2	★	2.1	2.1	2.1	2.1	2.0	2.1	0	0	5.0	3.1	2.6	2.5	5.0	0.5	0.5	0
PLAY	2.6	0.1	3.0	★	2.1	2.1	2.1	2.1	2.1	2.1	0	0	5.0	3.0	2.7	2.5	5.0	0.5	0.4	0
CUE	4.8	0.1	4.8	★	2.1	2.1	2.1	2.1	2.1	2.1	0	0	4.9	3.0	2.6	2.5	5.0	0.5	0.5	0.1
REV	4.7	0.1	4.8	★	2.1	2.1	2.1	2.1	2.1	2.1	4.7	0	5.0	3.0	2.6	2.4	5.0	0.5	0.4	0.1
F.ADV.	2.3	0	2.2	★	2.0	2.1	2.1	2.1	2.1	2.1	1.9	0	4.9	3.0	2.6	2.7	4.9	0.5	0.4	0
SLOW(1/4)	2.3	0	2.2	★	2.1	2.1	2.1	2.1	2.1	2.1	1.9	0	5.0	3.0	2.6	2.0	5.0	0.5	0.5	0

REF.NO.	IC2601																			
MODE	21	22	23	24																
STOP	0	0	2.0	11.8																
REC	0	0.5	3.1	11.8																
PLAY	0	0.5	3.1	11.7																
CUE	0	0.5	4.8	11.8																
REV	0	0.5	4.9	11.7																
F.ADV.	0	0.2	2.0	11.8																
SLOW(1/4)	0	0.1	2.2	11.8																

RF CONVERTER SCHEMATIC DIAGRAM

IMPORTANT NOTICE:
IF UNIT PARTS ARE REPLACED INDIVIDUALLY, THE FCC
SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.

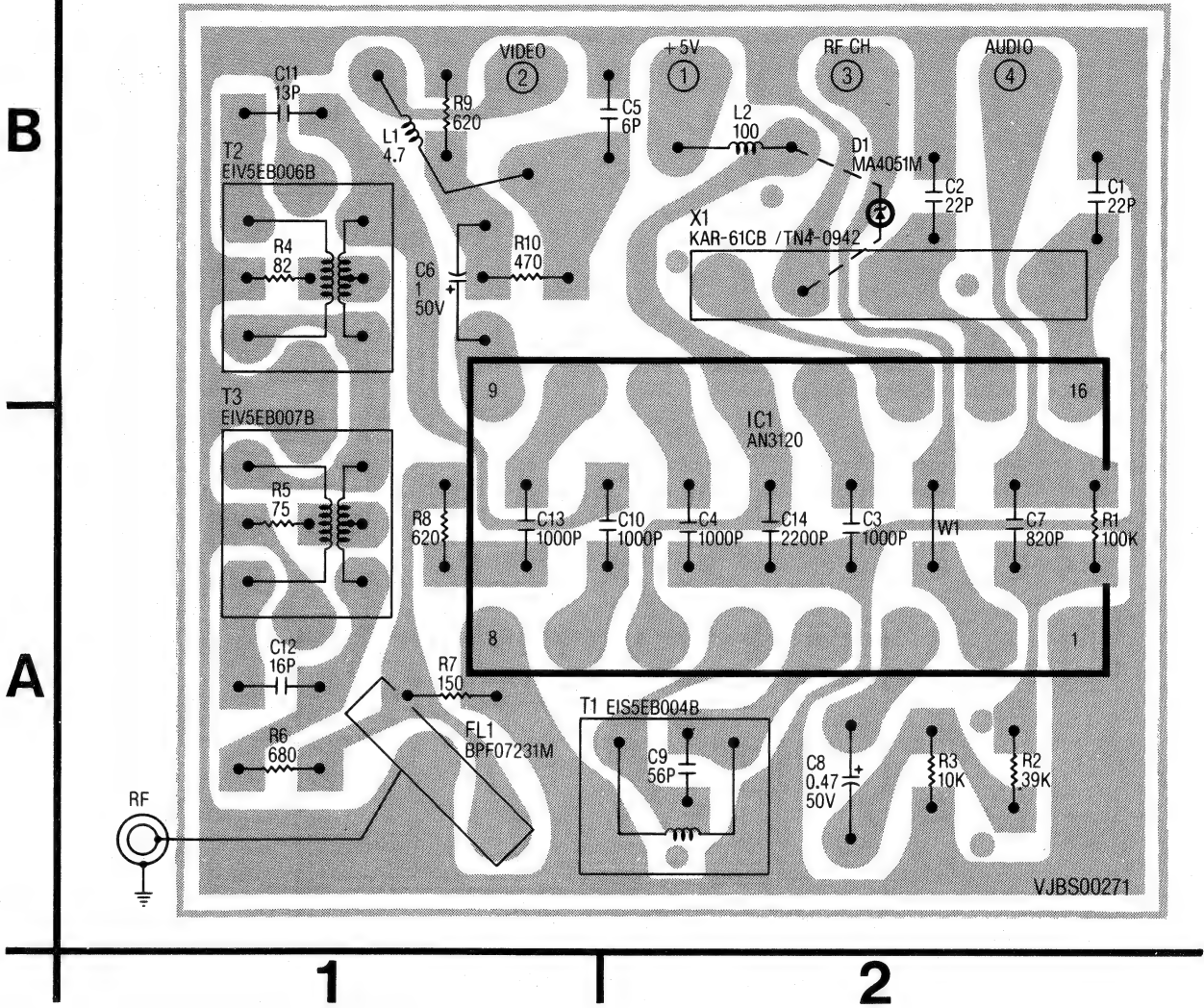
SPECIAL NOTE:
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ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.



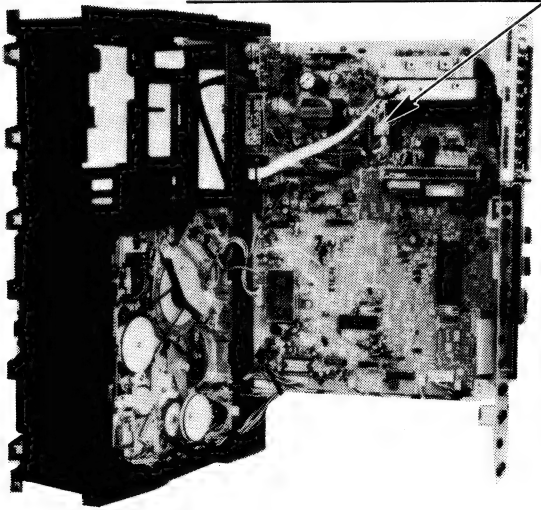
VJBS00271

RF CONVERTER UNIT (VEQS0252)

IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.



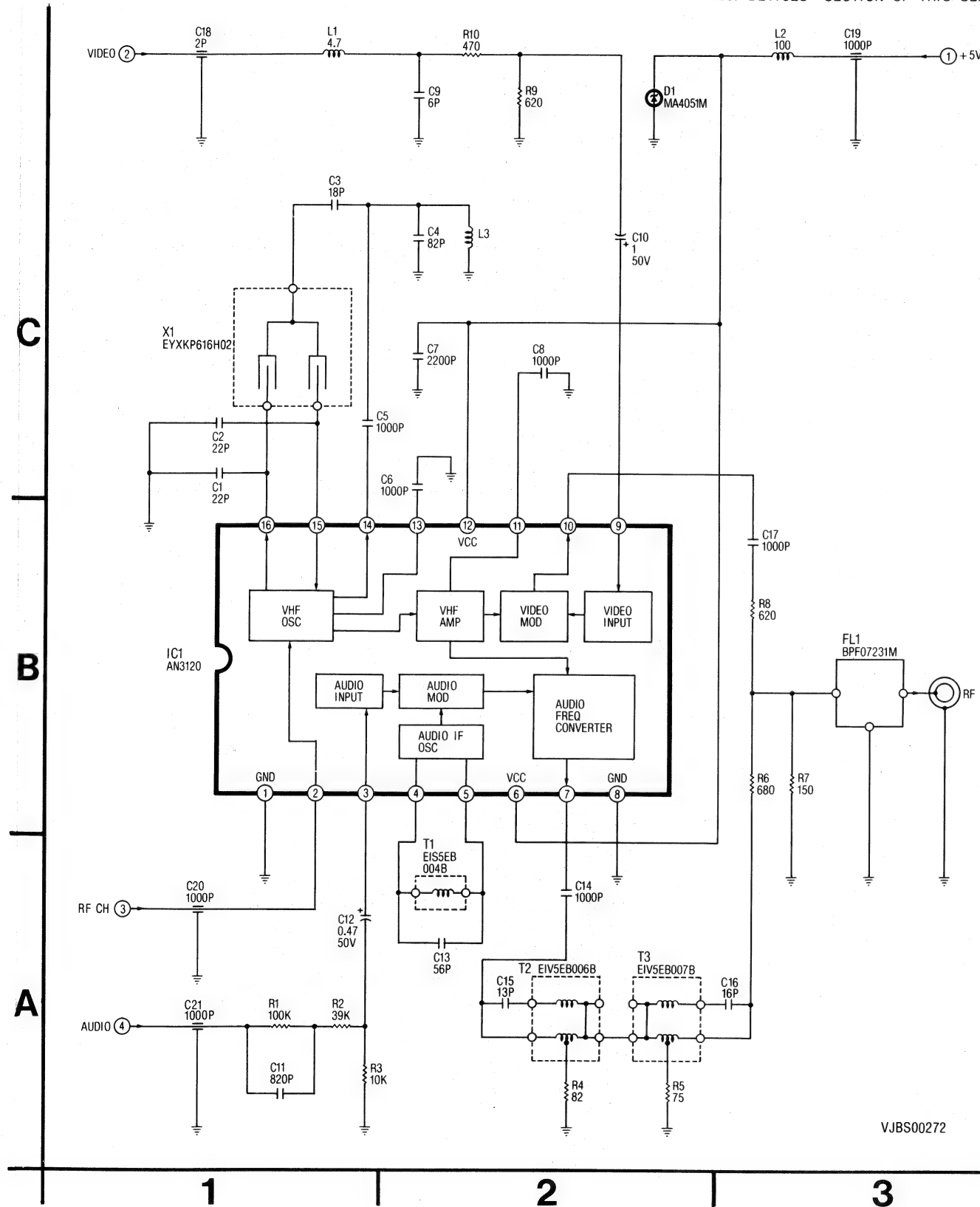
RF CONVERTER UNIT



RF CONVERTER SCHEMATIC DIAGRAM

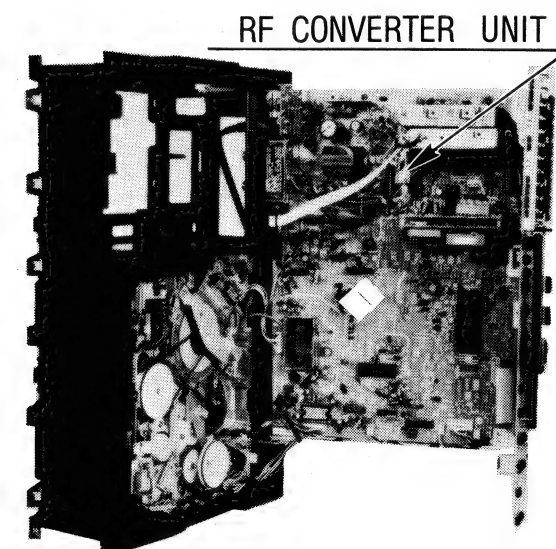
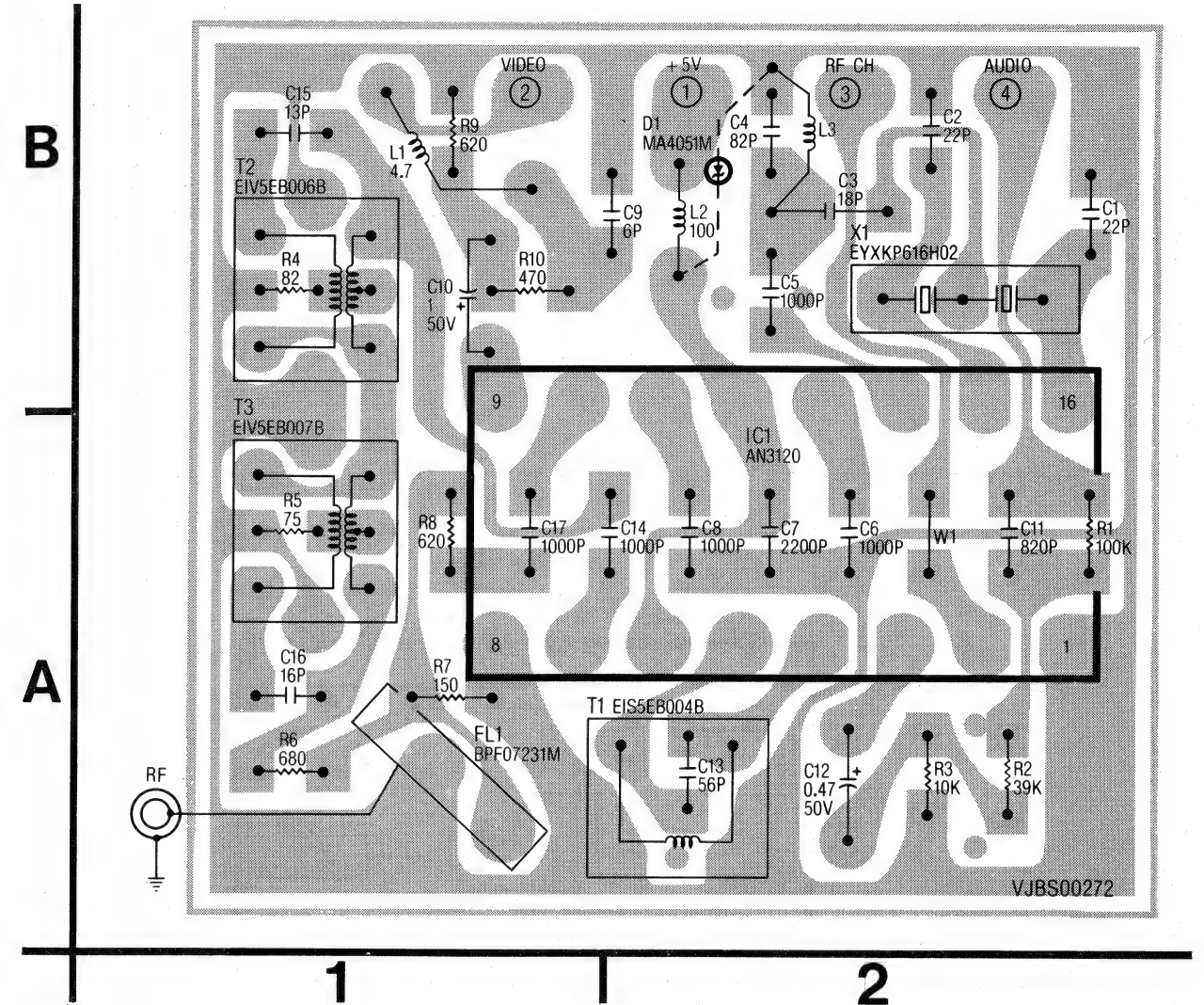
IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
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(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.



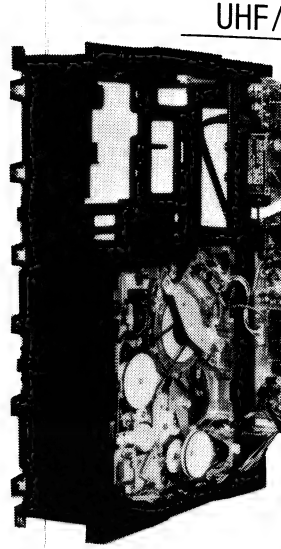
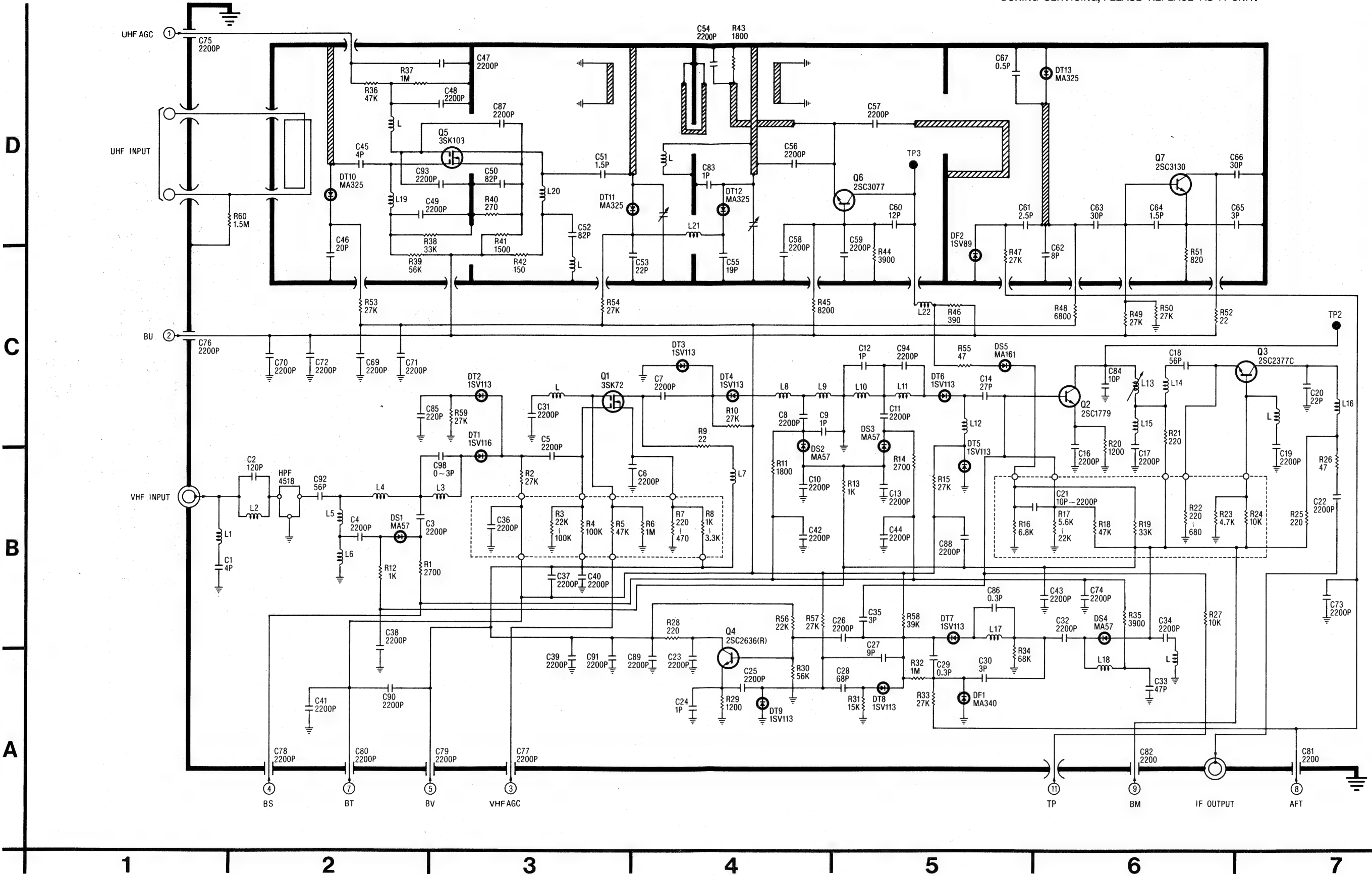
RF CONVERTER UNIT (VEQS0253)

IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.



UHF/VHF TUNER SCHEMATIC DIAGRAM TNV56751F2R (PV-1230)

IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.



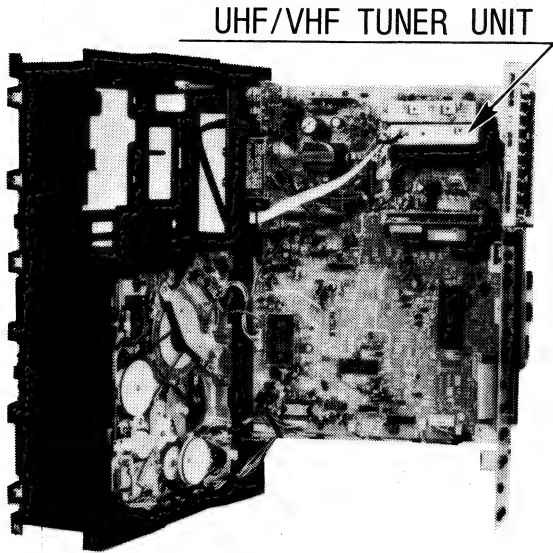
UHF SCHEI
Q1
Q2
Q3
Q4
Q5
Q6
Q7

UHF
Q1
Q2
Q3
Q4
Q5
Q6
Q7

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS /
ELECTROSTATICALLY SENSIT
HANDLING TECHNIQUES DESC
(ES) DEVICES" SECTION OF

UHF/VHF TUNER UNIT TNV56751F2R (PV-1230)

IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
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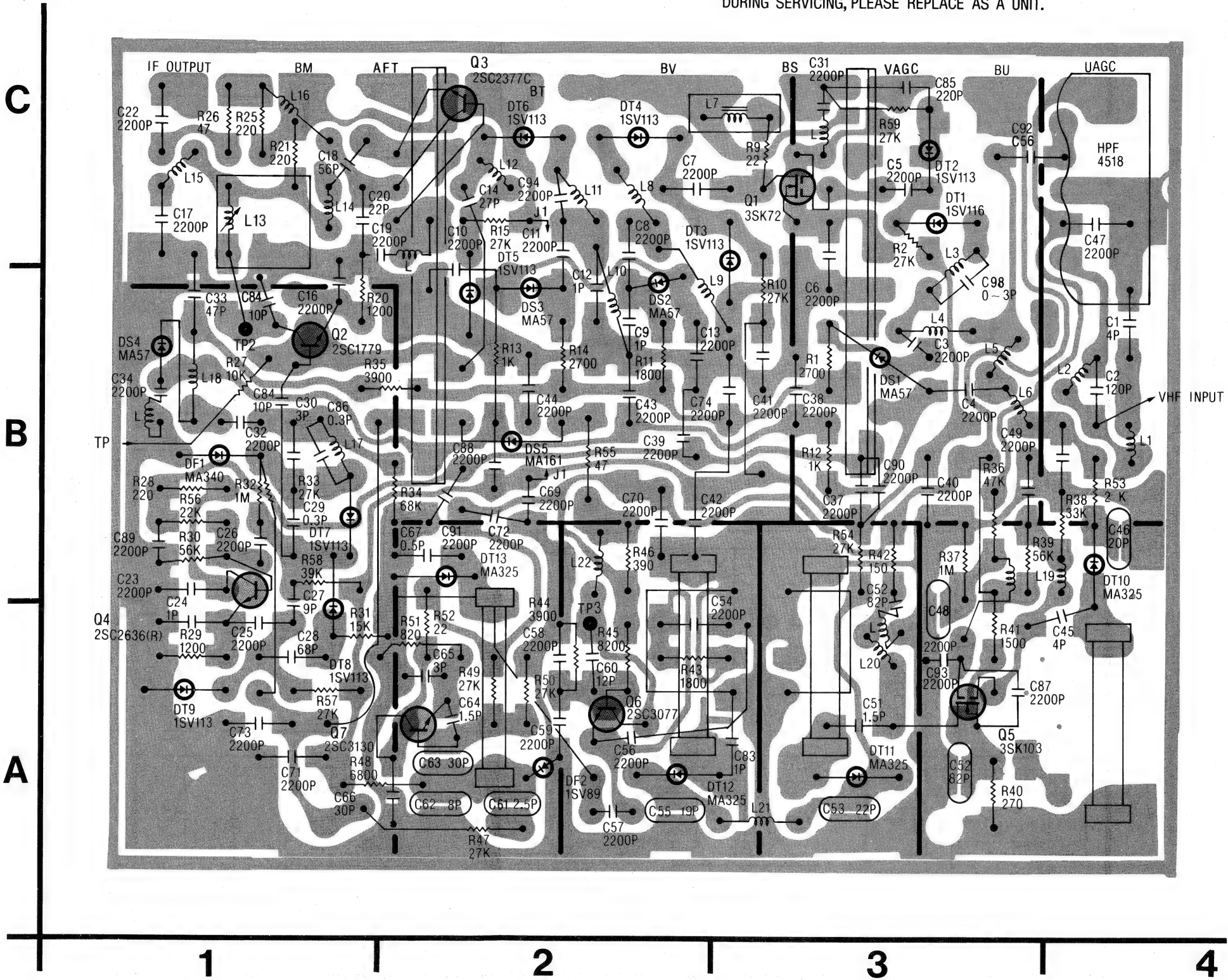


UHF/VHF TUNER
SCHEMATIC DIAGRAM

Q1	3-C
Q2	6-C
Q3	7-C
Q4	4-A
Q5	3-D
Q6	5-D
Q7	6-D

UHF/VHF TUNER
UNIT

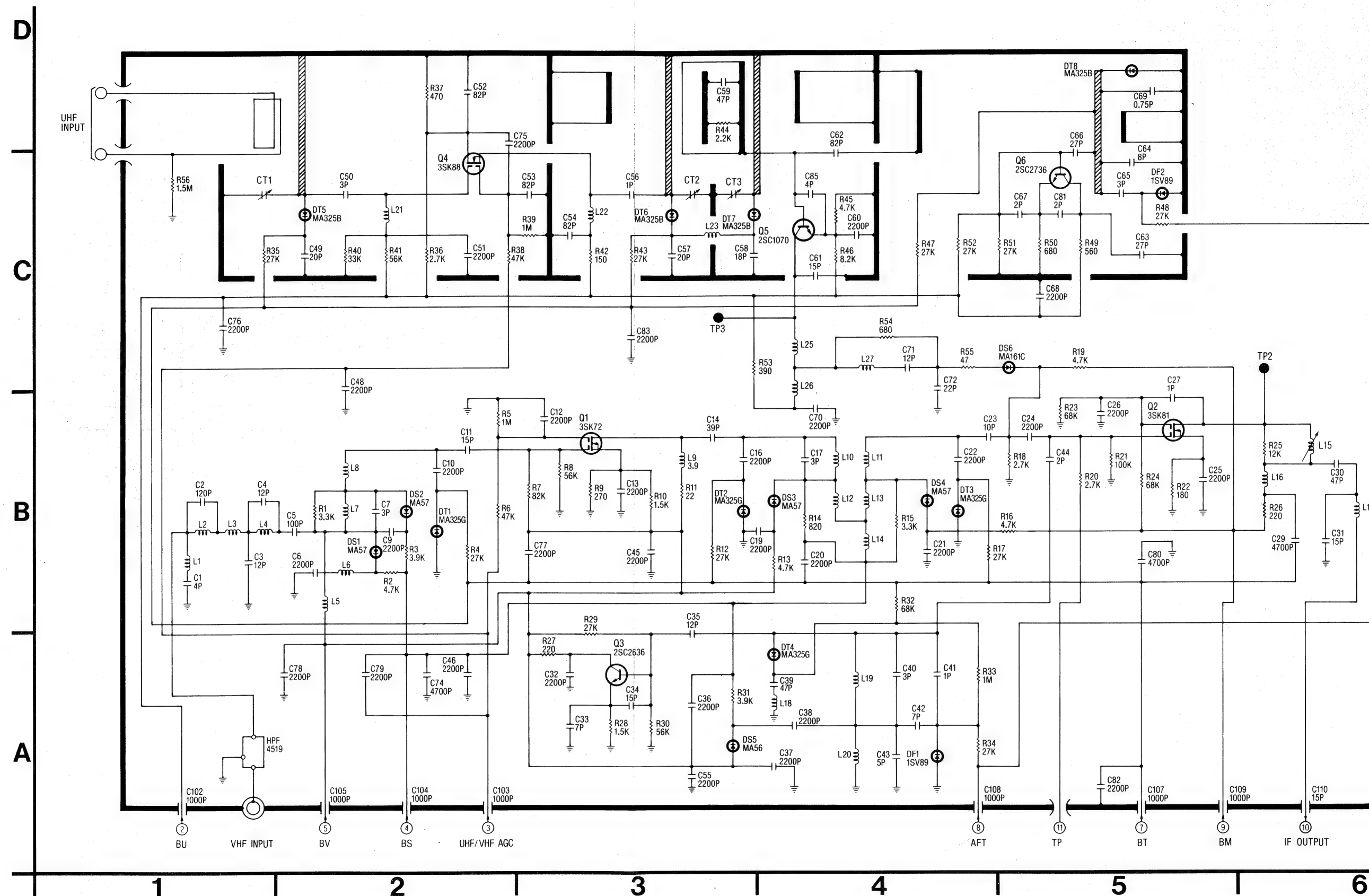
Q1	3-C
Q2	1-B
Q3	2-C
Q4	1-B
Q5	3-A
Q6	2-A
Q7	2-A



SPECIAL NOTE:
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UHF/VHF TUNER SCHEMATIC DIAGRAM TNV76775F2R (PV-1222,PV-1225)

IMPORTANT NOTICE:
IF UNIT PARTS ARE REPLACED INDIVIDUALLY, THE FCC
SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.

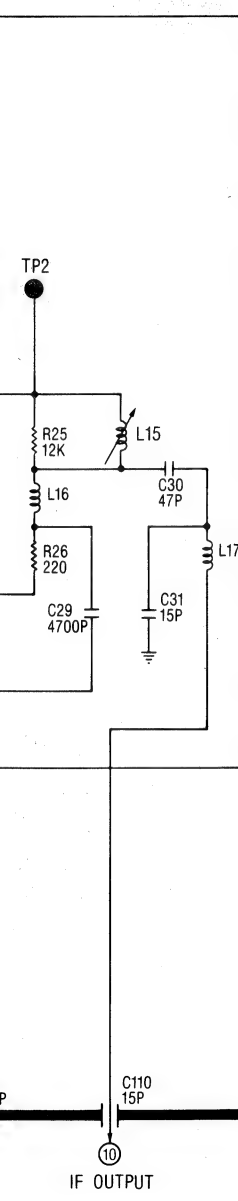
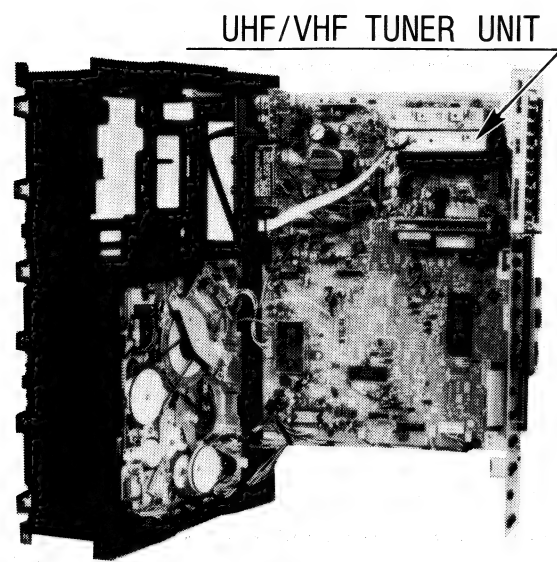


SPECIAL
ALL INTER
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(ES) DEVI

DIVIDUALLY, THE FCC
TISFIED.
CE AS A UNIT.

UHF/VHF TUNER UNIT TNV76775F2R (PV-1222,PV-1225)

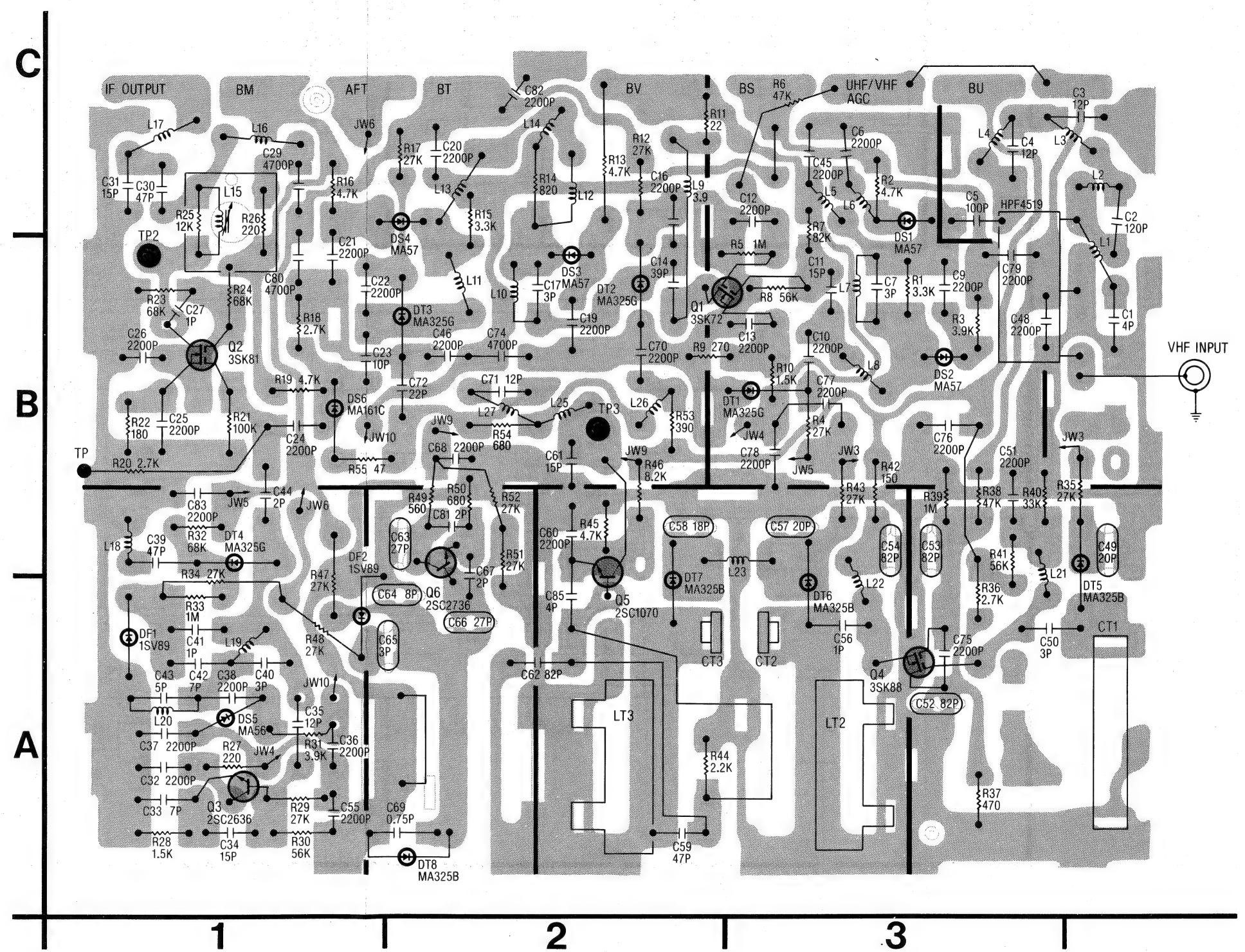
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UHF/VHF TUNER SCHEMATIC DIAGRAM	
Q1	3-B
Q2	5-B
Q3	3-A
Q4	2-C
Q5	4-C
Q6	5-C

UHF/VHF TUNER UNIT	
Q1	3-B
Q2	1-B
Q3	1-A
Q4	3-A
Q5	2-B
Q6	2-B

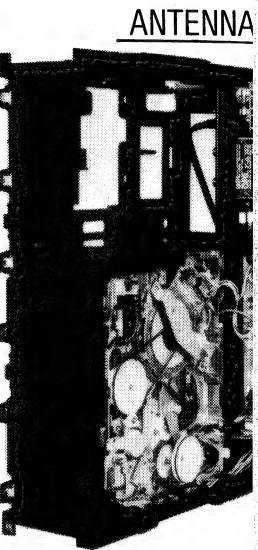
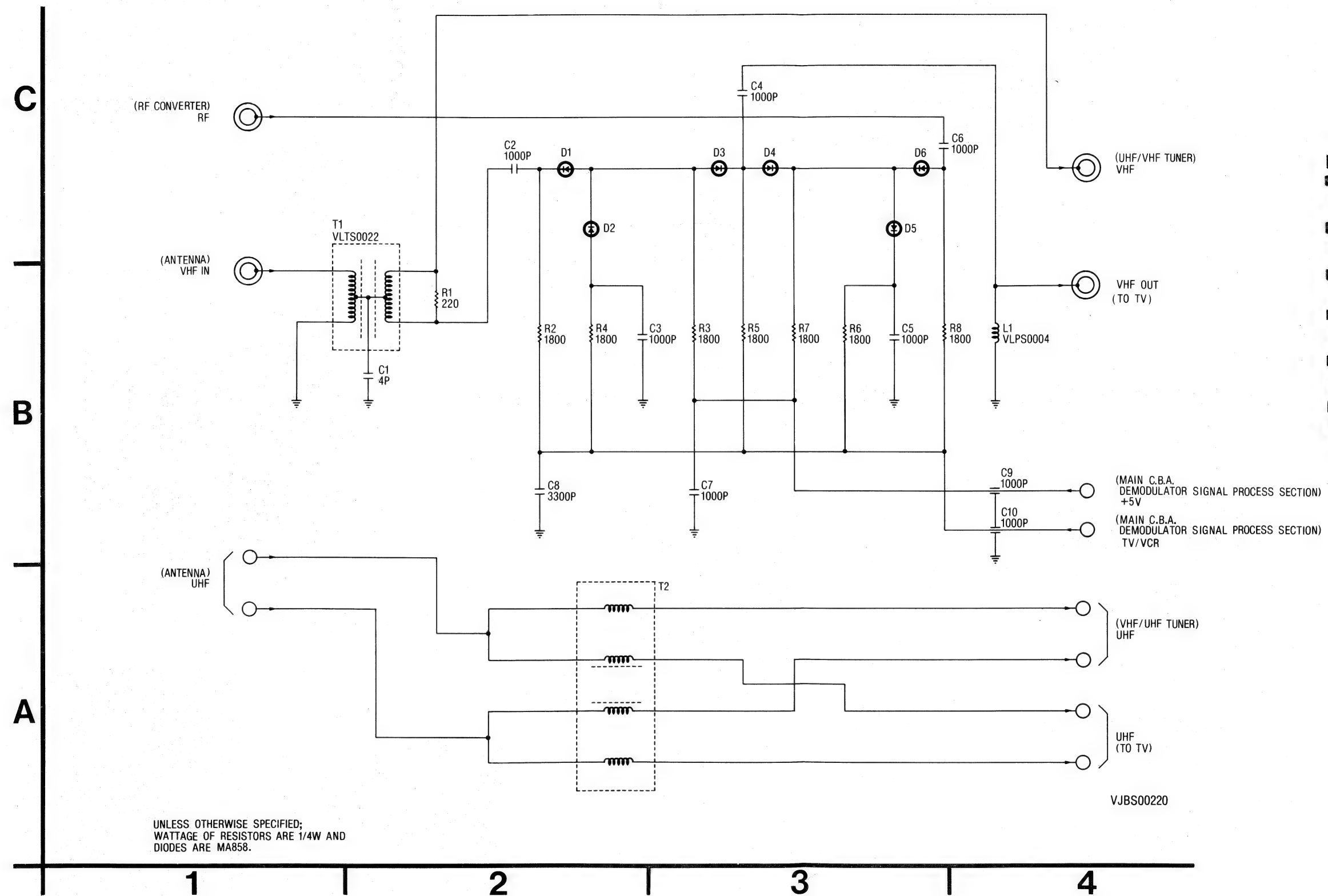
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ANTENNA TERMINAL SCHEMATIC DIAGRAM

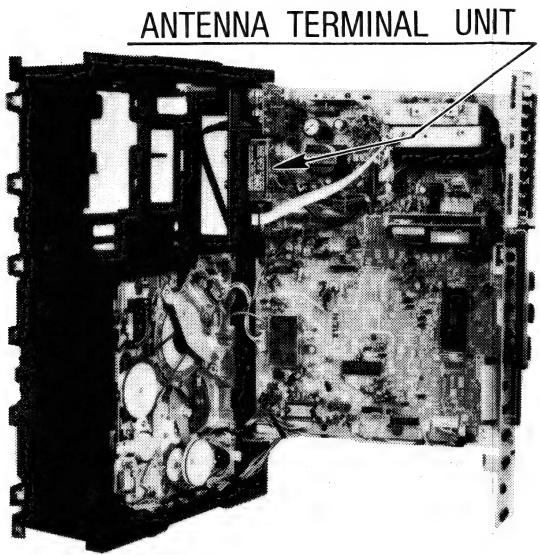
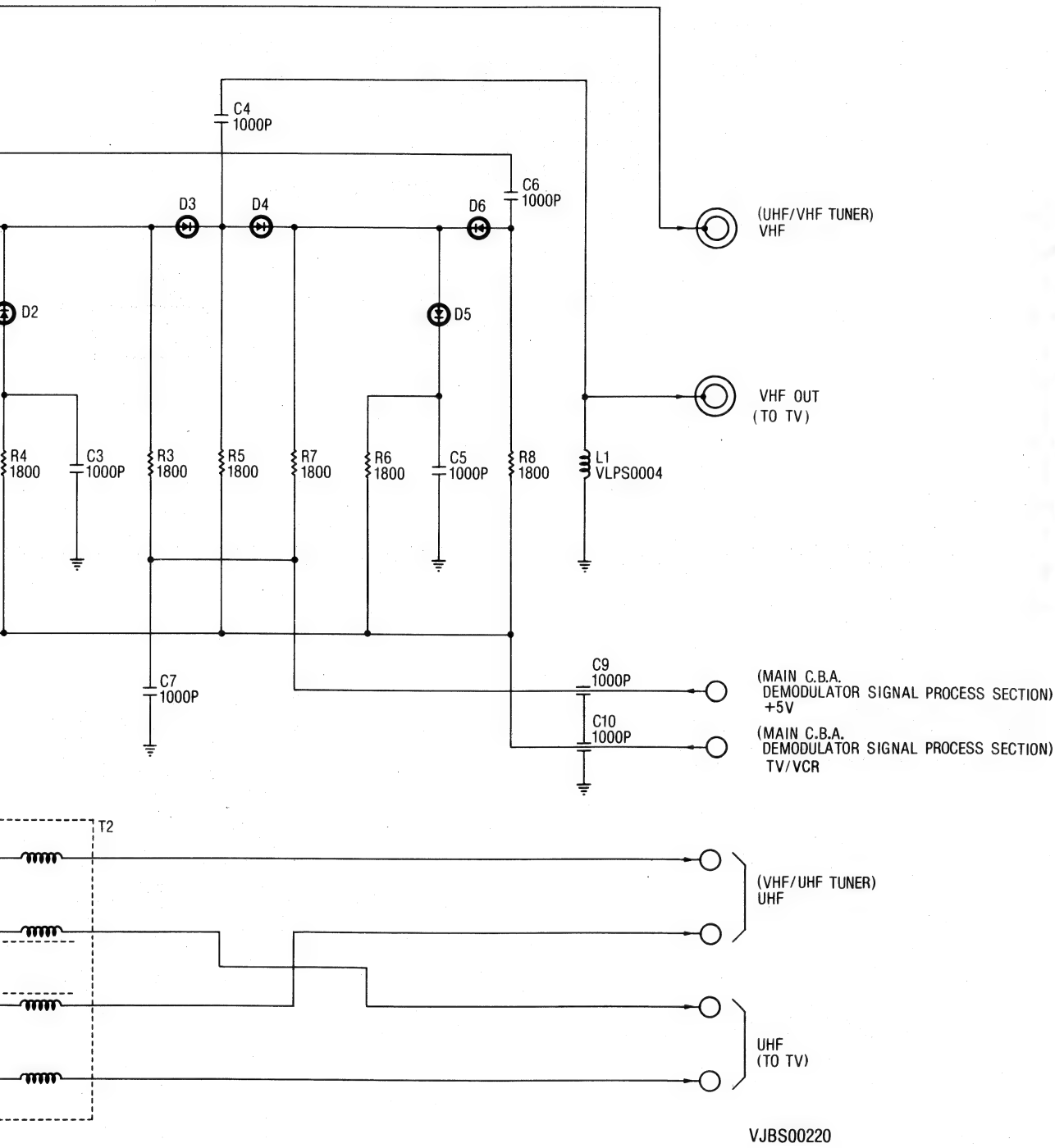
IMPORTANT NOTICE:
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SPECIFICATIONS WILL NOT BE SATISFIED.
DURING SERVICING, PLEASE REPLACE AS A UNIT.

SPECIAL NOTE:
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ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE
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(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.



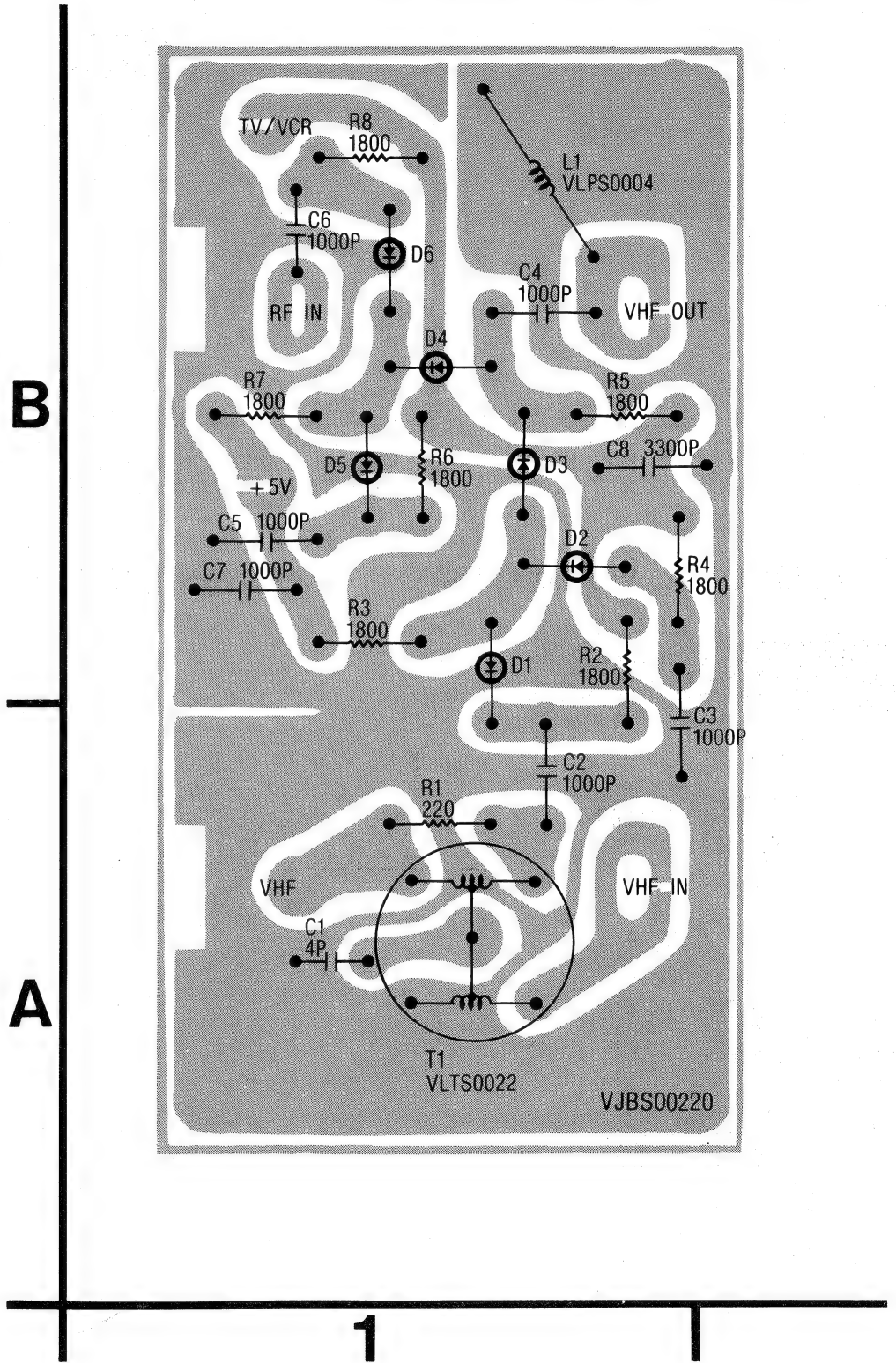
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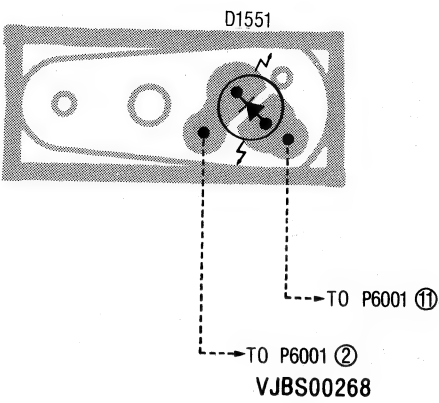


ANTENNA TERMINAL UNIT

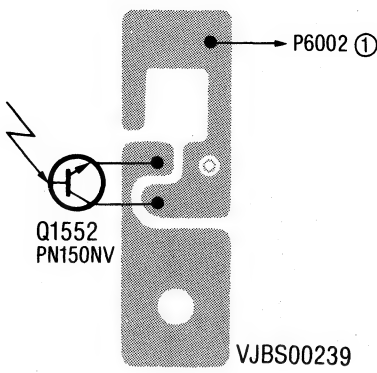
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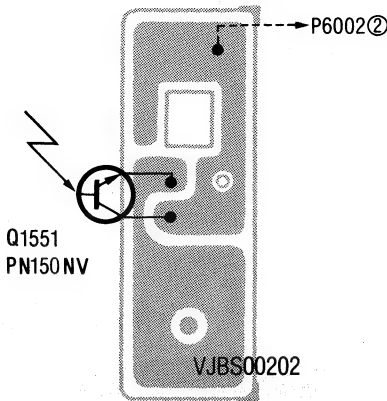
SENSOR LED C.B.A.



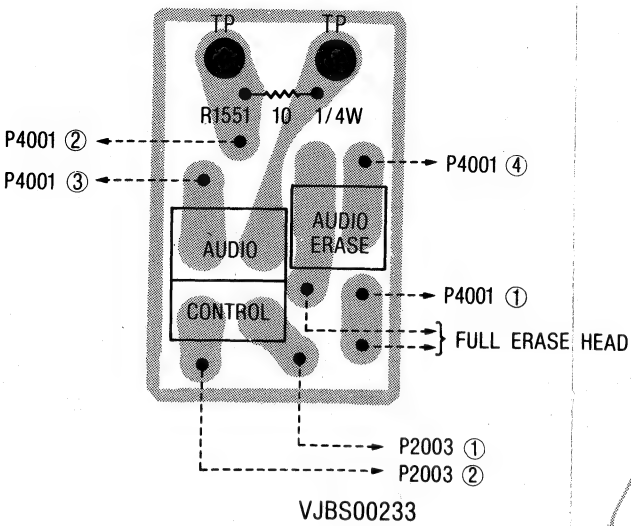
SUPPLY PHOTO TR C.B.A.



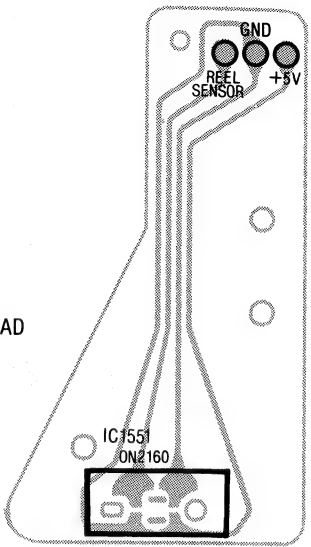
TAKEUP PHOTO TR C.B.A.



AUDIO/CONTROL
HEAD C.B.A.



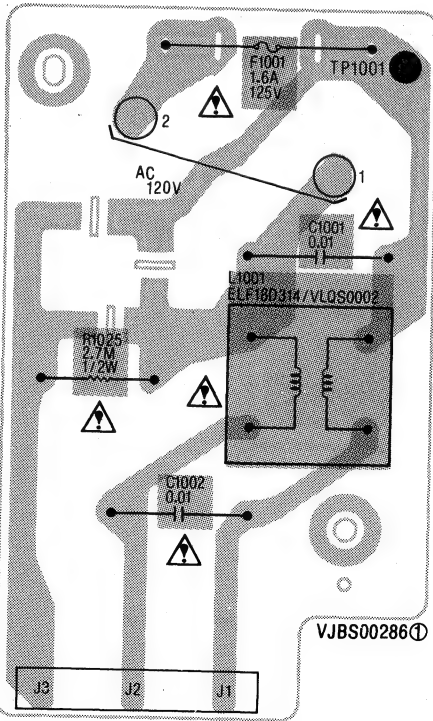
REEL SENSOR C.B.A.
VEPS002



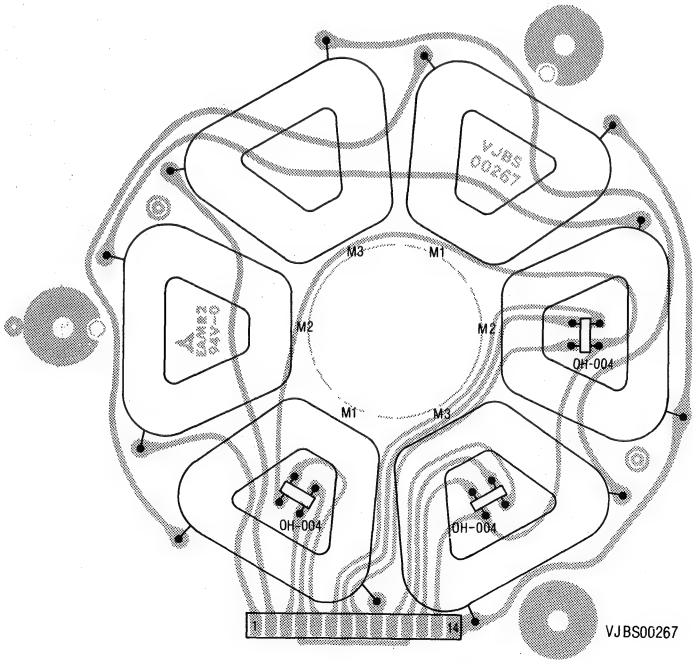
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LINE FILTER C.B.A. VEPS00286A

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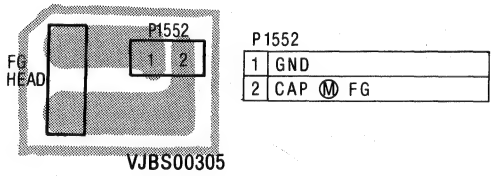


CAPSTAN STATOR COIL ASS'Y VEMS0058

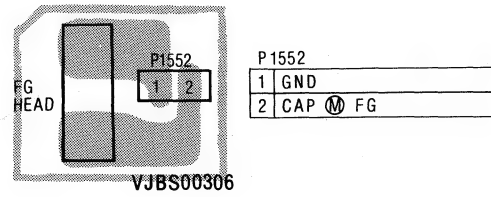


1	MAIN COIL 2
2	MAIN COIL 3
3	H3 -
4	
5	H3 +
6	H1 -
7	
8	H1 +
9	MAIN COIL 1
10	H2 -
11	VH +
12	H2 +
13	VH -
14	

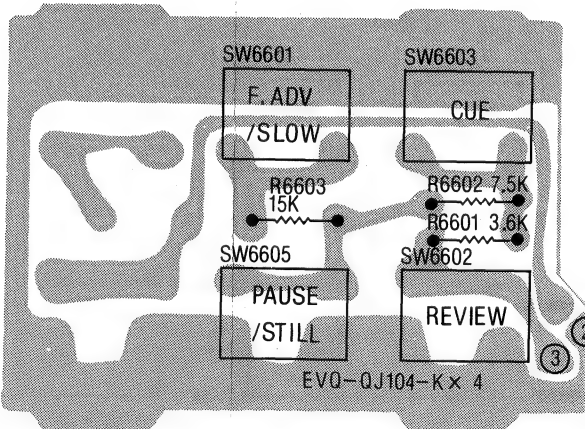
CAPSTAN FG C.B.A.



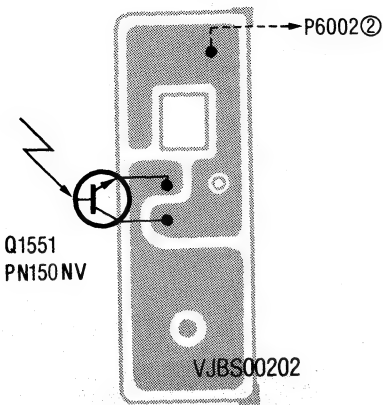
CAPSTAN FG C.B.A.



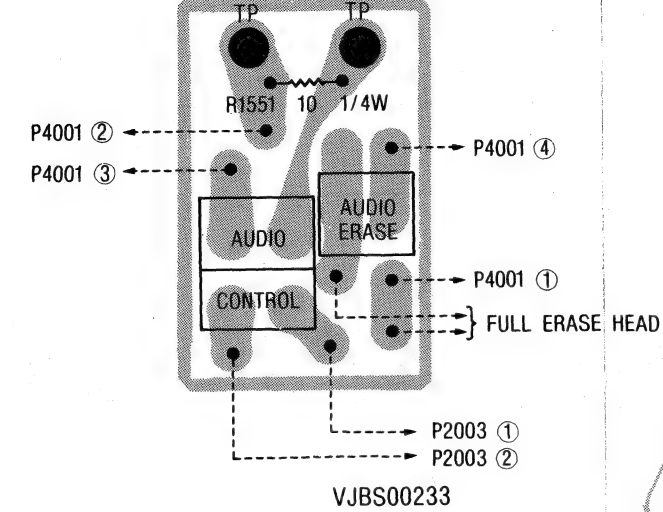
WIRED TRANSMITTER (5FUNC)



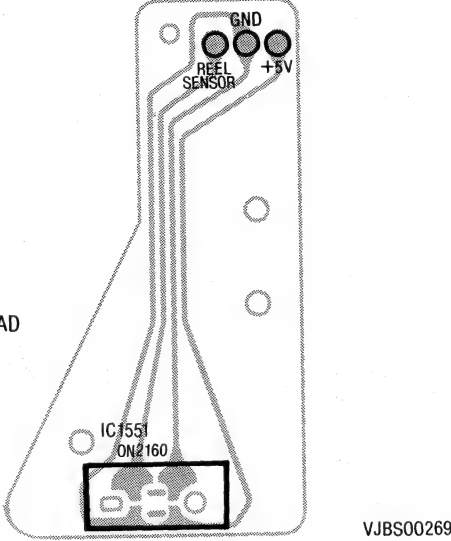
TAKEUP PHOTO TR C.B.A.



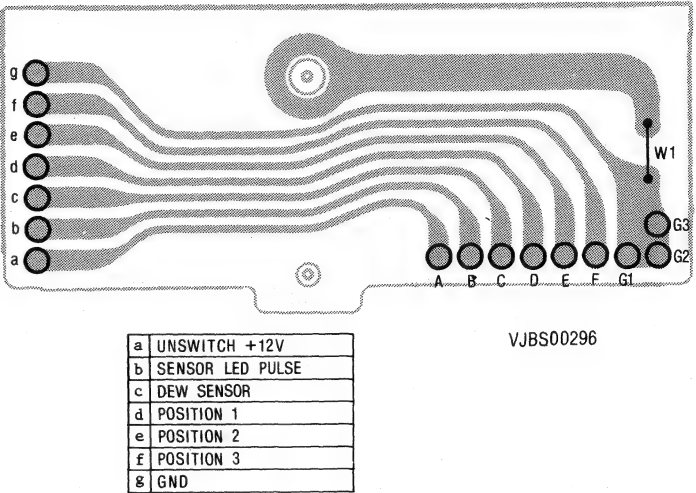
AUDIO/CONTROL HEAD C.B.A.



REEL SENSOR C.B.A.
VEPS00269A



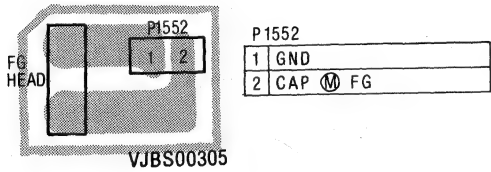
CONNECTION C.B.A.



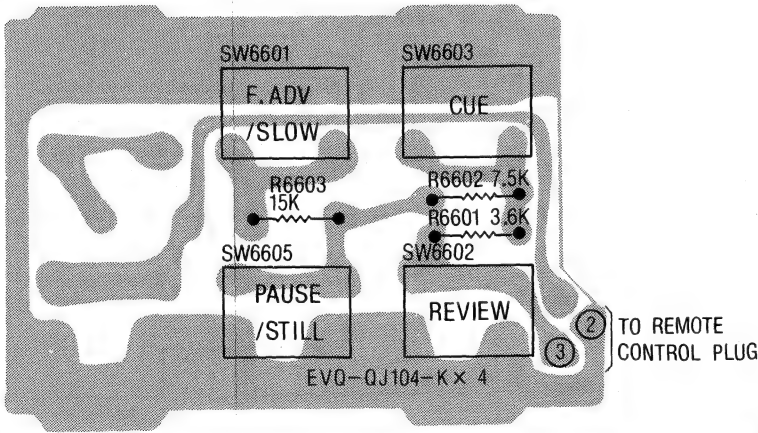
CES ARE
AL
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'EMS0058

CAPSTAN FG C.B.A.

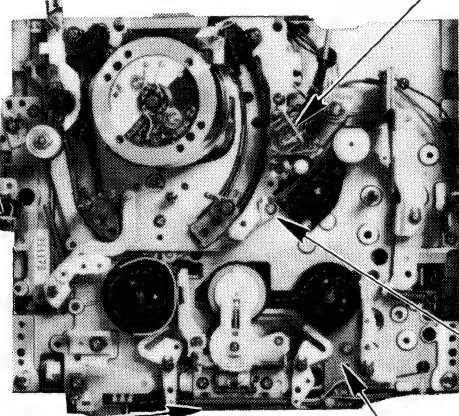


WIRED TRANSMITTER (5FUNCTION) UNIT



SUPPLY PHOTO TR C.B.A. TAKEUP PHOTO TR C.B.A.

AUDIO/CONTROL HEAD C.B.A.

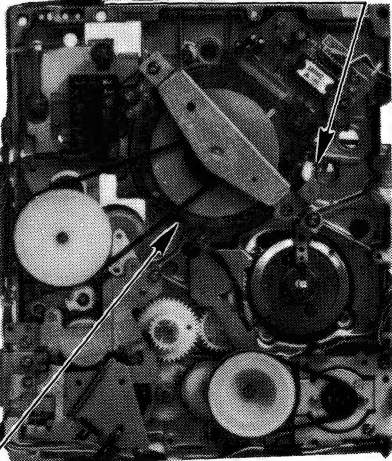


REEL SENSOR C.B.A.

CONNECTION C.B.A.

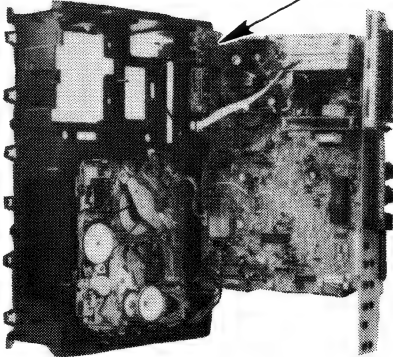
SENSOR LED C.B.A.

CAPSTAN FG C.B.A.




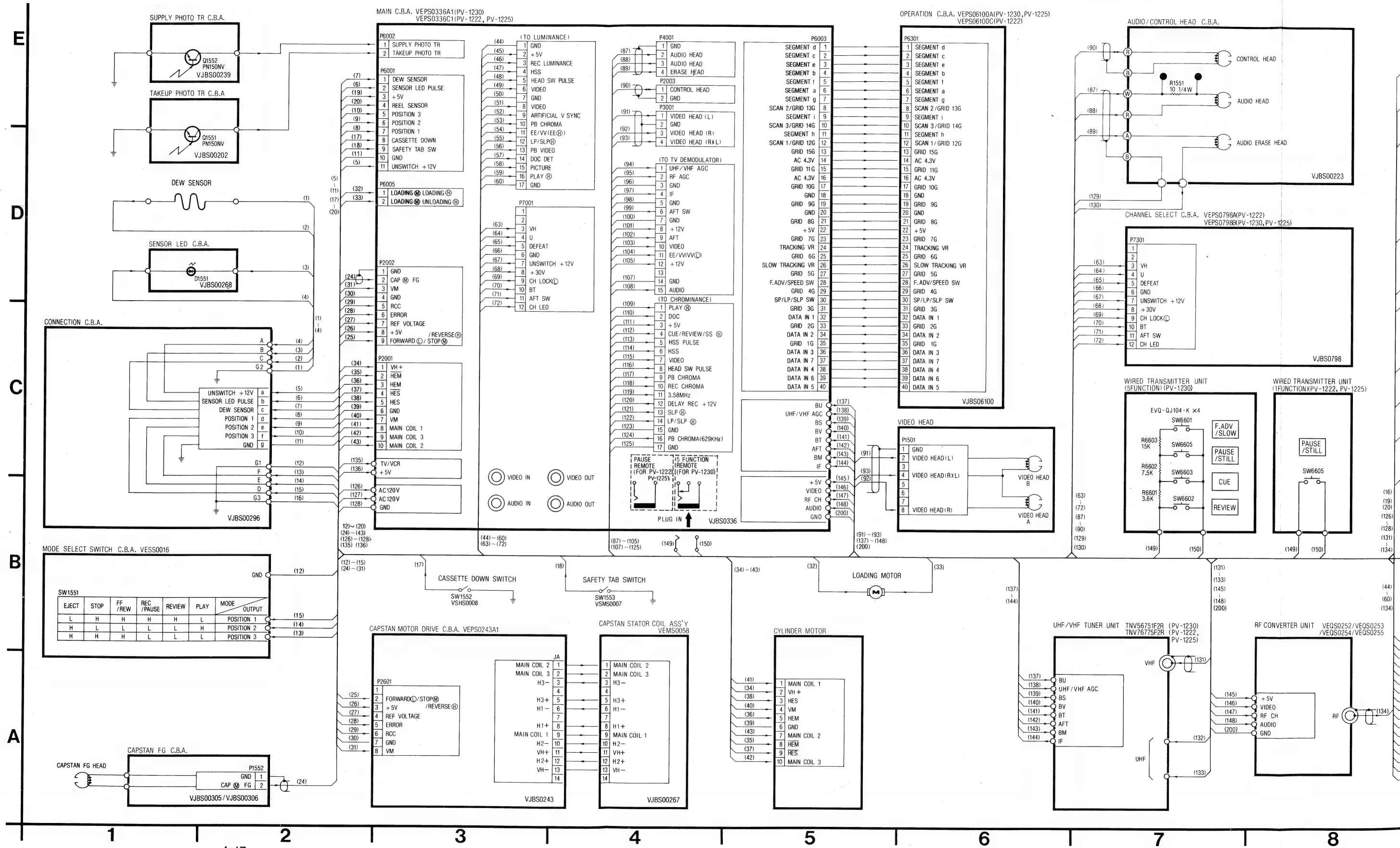
CAPSTAN STATOR COIL ASS'Y


LINE FILTER C.B.A.



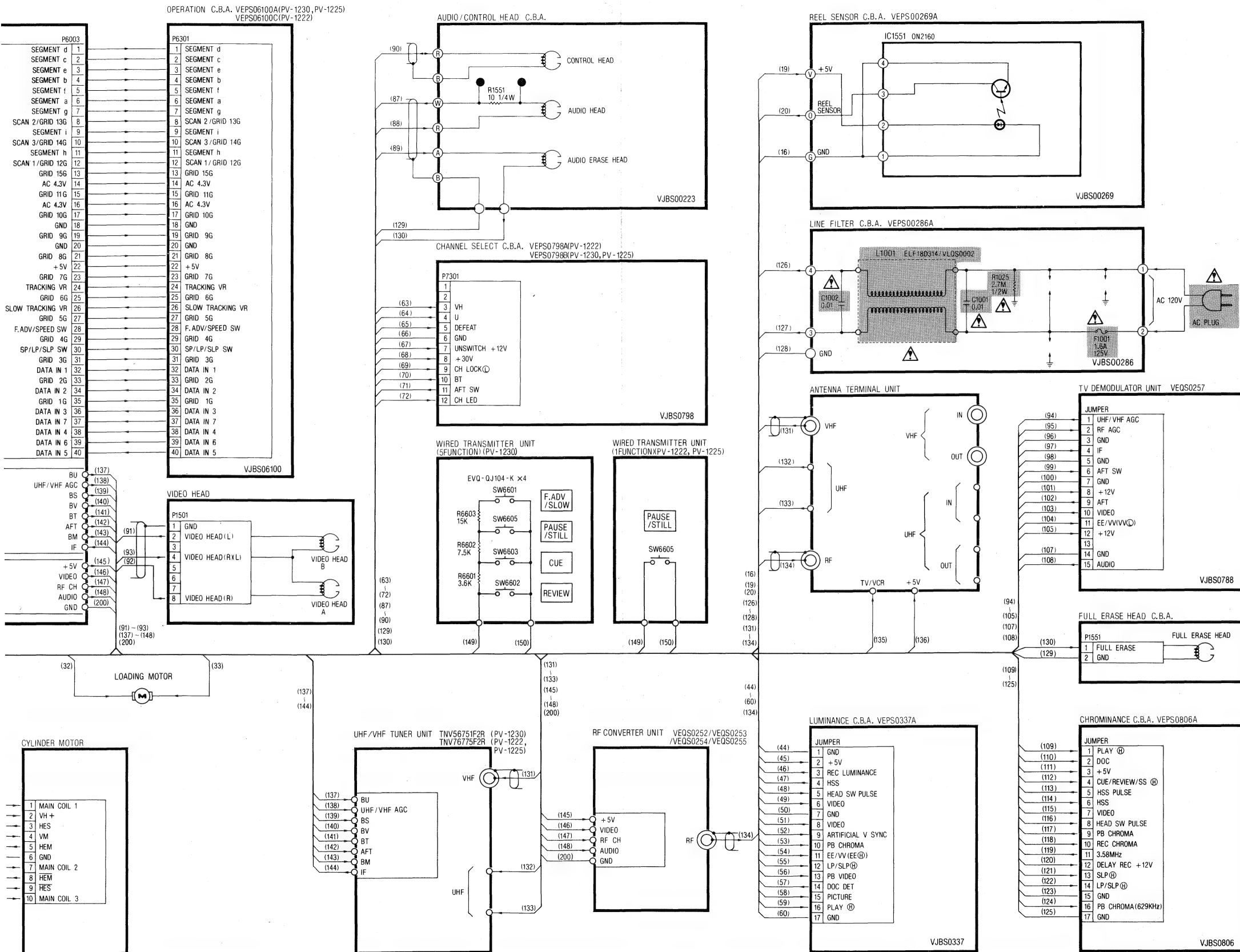
INTERCONNECTION SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.



IMPORTANT SAFETY NOTICE: COMPONENTS IDENTIFIED BY THE SIGN  HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SPECIFIED PARTS.

SPECIAL NOTE:
ALL INTEGRATED CIRCUITS AND MANY OTHER SEMICONDUCTOR DEVICES ARE
ELECTROSTATICALLY SENSITIVE AND THEREFORE REQUIRE THE SPECIAL
HANDLING TECHNIQUES DESCRIBED UNDER THE "ELECTROSTATICALLY SENSITIVE
(ES) DEVICES" SECTION OF THIS SERVICE MANUAL.



Service Manual

Video Cassette Recorder

Panasonic
Omnivision VHS
Vol. 5

Exploded Views Replacement Parts List

PV-1230
PV-1222
PV-1225

SPECIFICATIONS

Power Source: 120V AC $\pm 10\%$, 60Hz $\pm 0.5\%$
 Power Consumption: Approx. 18 watts
 Television System: EIA Standard (525 lines, 60 fields)
 NTSC color signal

Video Recording

System: 2 rotary heads, helical scanning system
 Luminance: FM azimuth recording
 Color signal: Converted subcarrier phase shift recording

Audio Track: 1 track
 Tape Format: Tape width 1/2" (12.7mm), high density tape

Tape Speed: SP mode: 1-5/16 i.p.s. (33.35mm/s)
 LP mode: 21/32 i.p.s. (16.67mm/s)
 SLP mode: 7/16 i.p.s. (11.12mm/s)

Record/Playback Time: 8 HRS. with 160 min. type tape used in SLP mode

FF/REW Time: Less than 6 min. with 120 min. type tape

Heads: Video: 2 rotary heads
 Audio/Control: 1 stationary head
 Erase: 1 full track erase
 1 audio track erase

Input Level: Video: VIDEO IN Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO IN Jack (RCA type)
 -20dB, 50k Ω unbalanced

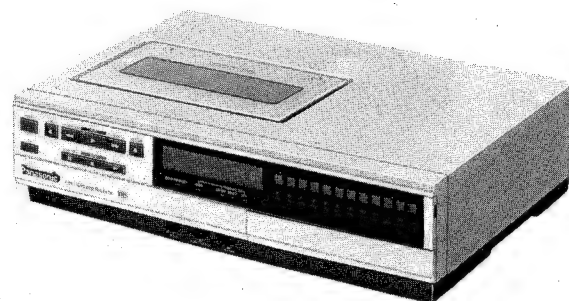
TV Tuners: VHF Input: VHF Ch2-Ch13,
 75 Ω unbalanced
 UHF Input: Ch14-Ch83,
 300 Ω balanced

Output Level: Video: VIDEO OUT Jack (RCA type)
 1.0Vp-p, 75 Ω unbalanced
 Audio: AUDIO OUT Jack (RCA type)
 -6dB, 600 Ω unbalanced

RF Modulated: Ch3/Ch4 switchable,
 72dB μ , (Open Voltage)
 75 Ω unbalanced

Video Horizontal

Resolution: Color: more than 230 lines
 B/W: more than 230 lines



Audio Frequency

Response: SP mode: 100Hz~8kHz
 (10dB down) LP mode: 100Hz~6kHz
 SLP mode: 150Hz~5kHz

Signal-to-Noise Ratio: Video: SP mode: better than 41dB
 LP mode: better than 41dB
 SLP mode: better than 41dB
 (Rohde & Schwarz noise meter)
 Audio: SP mode: better than 42dB
 LP mode: better than 40dB
 SLP mode: better than 40dB

Operation

Temperature: 41°F-104°F (5°C-40°C)

Operating Humidity: 10%-75%

Weight: 13.0 lbs. (5.9kg)

Dimensions: 16-15/16"(W) \times 11-5/8"(D) \times 4-1/4"(H)
 (430mm \times 295mm \times 108mm)

Accessories Supplied: • Remote control unit
 • VHF connecting cable
 • 300 Ω -75 Ω transformer
 • Twin-lead cable

Available Tapes:

1/2" VHS video cassette tapes
 NV-T160 Approx. 1073ft. (327m), 160,
 320, or 480 min
 NV-T120 Approx. 810ft. (247m), 120, 240,
 or 360 min
 NV-T60 Approx. 417ft. (127m), 60, 120,
 or 180 min.

Weight and dimensions shown are approximate. Specifications are subject to change without notice.

Panasonic®

Matsushita Engineering & Service Company
 Division of Matsushita Electric
 Corporation of America
 50 Meadowland Parkway, Secaucus,
 New Jersey 07094

Panasonic Hawaii Inc.
 91-238 Kauhi St. Ewa Beach
 P.O. Box 774
 Honolulu, Hawaii 96808-0774

Matsushita Electric
 of Canada Limited
 5770 Ambler Drive, Mississauga,
 Ontario, L4W 2T3

Panasonic Sales Company,
 Division of Matsushita Electric
 of Puerto Rico, Inc.
 Ave. 65 De Infanteria, KM 9.7
 Victoria Industrial Park
 Carolina, Puerto Rico 00630

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IMPORTANT SAFETY NOTICE

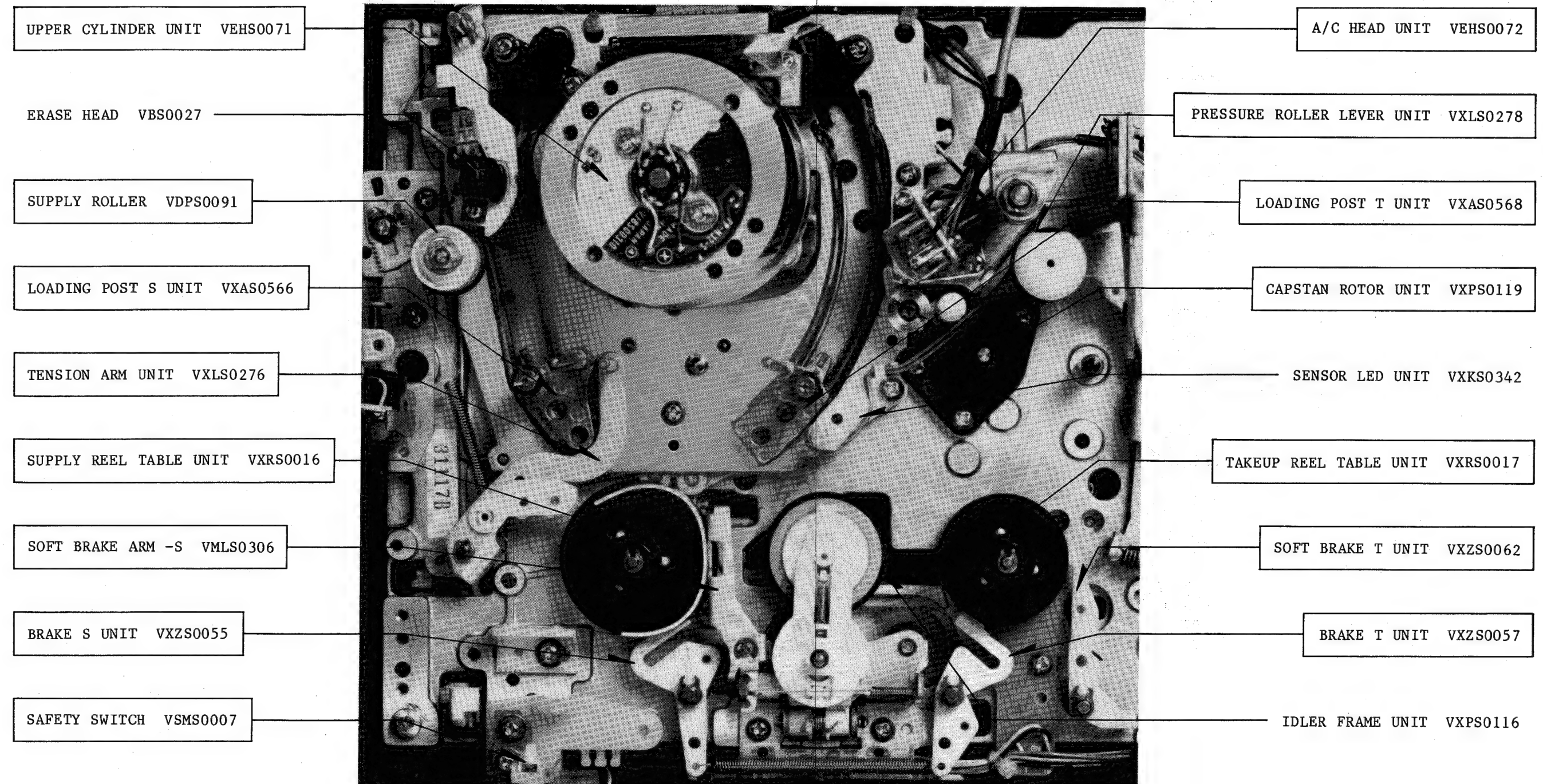
There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

INNER PARTS LOCATION

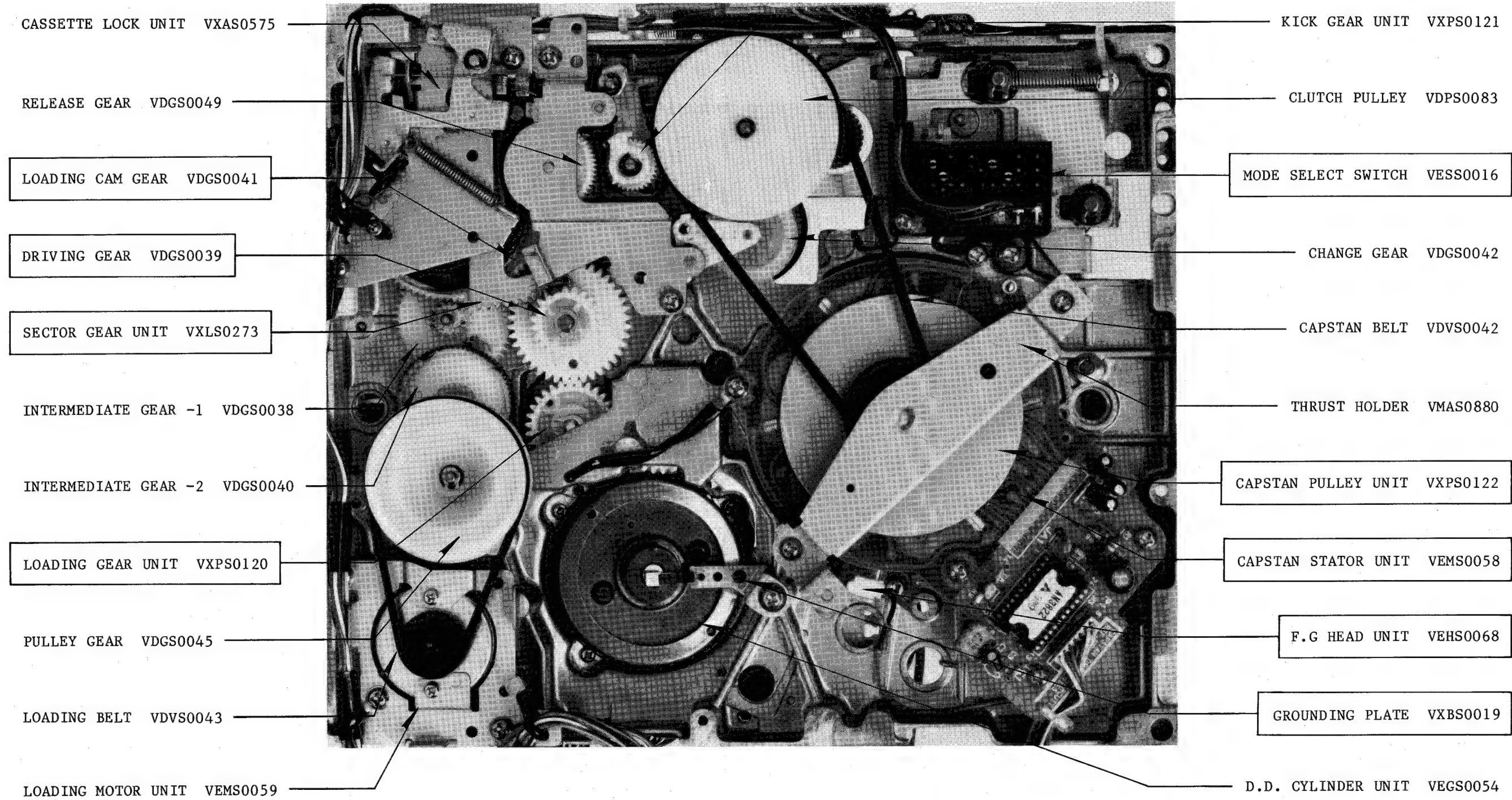
TOP VIEW

Note:

When the mechanical parts surrounded by rectangle are removed or replaced, be sure to perform necessary adjustment or confirmation procedures according to the mechanical adjustment procedures section.



BOTTOM VIEW



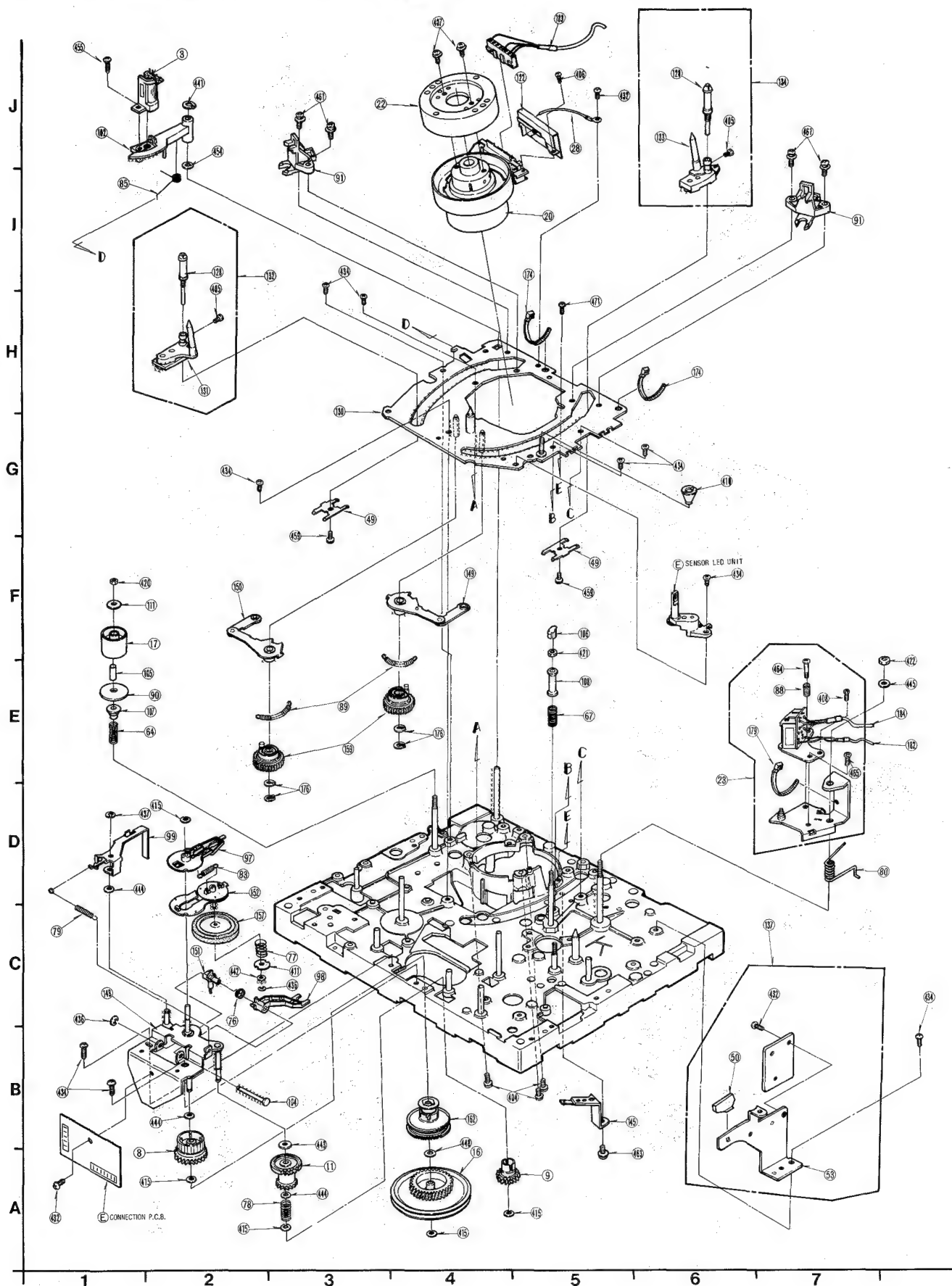
LUBRICATION POINTS

When the marked parts are replaced, apply the recommended lubricants or adhesive for better maintenance of the unit.

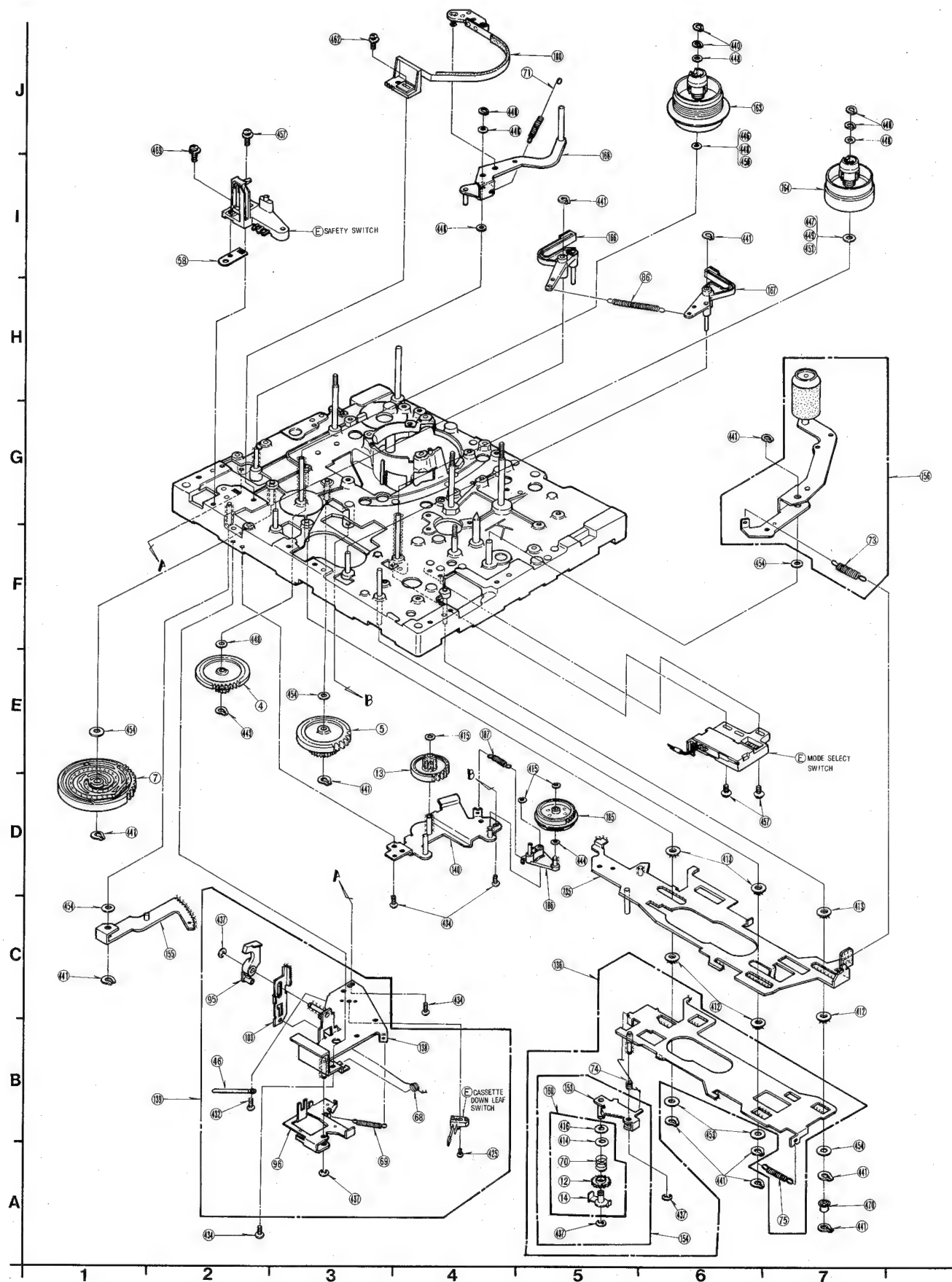
Marks	Kind of Lubricant	Availability	Part Number
XXX	Molytone Grease	Available From Factory	MOR265
OOO	Spindle Oil	Purchase From Local Supplier
△△△	Gummed Adhesive	Purchase From Local Supplier

EXPLODED VIEWS

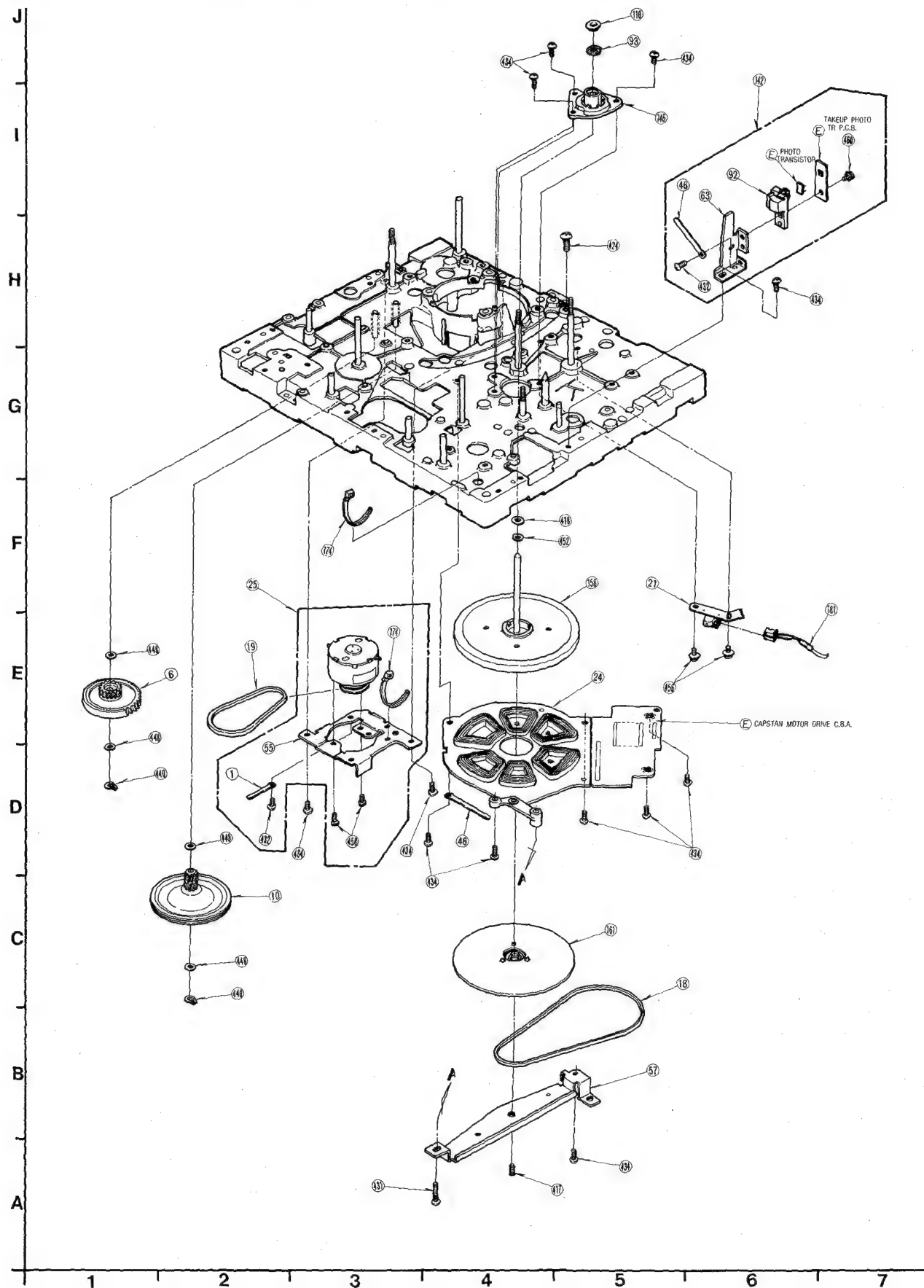
1 Transport Section



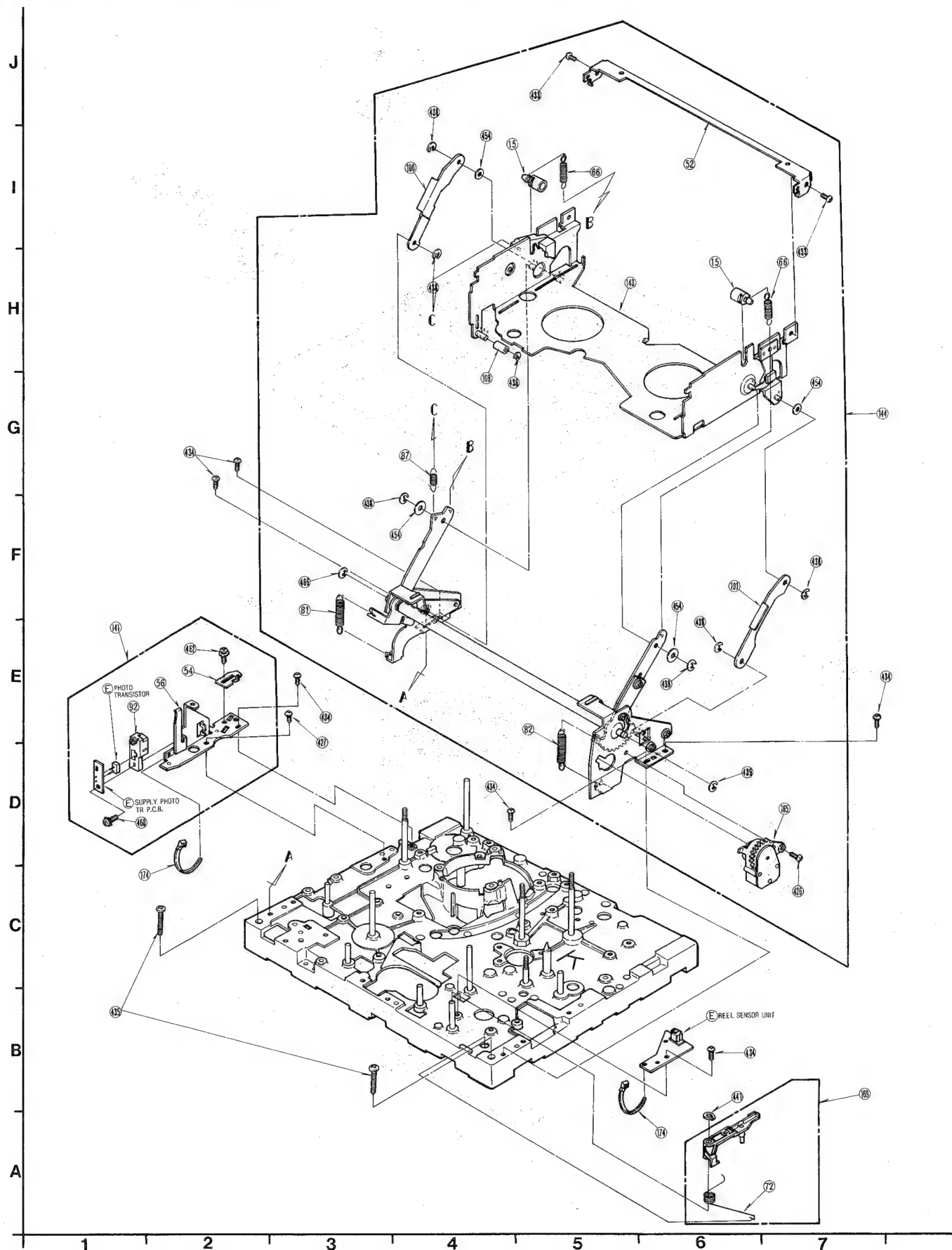
2 Moving Mechanism Section-(1)




3 Moving Mechanism Section-(2)

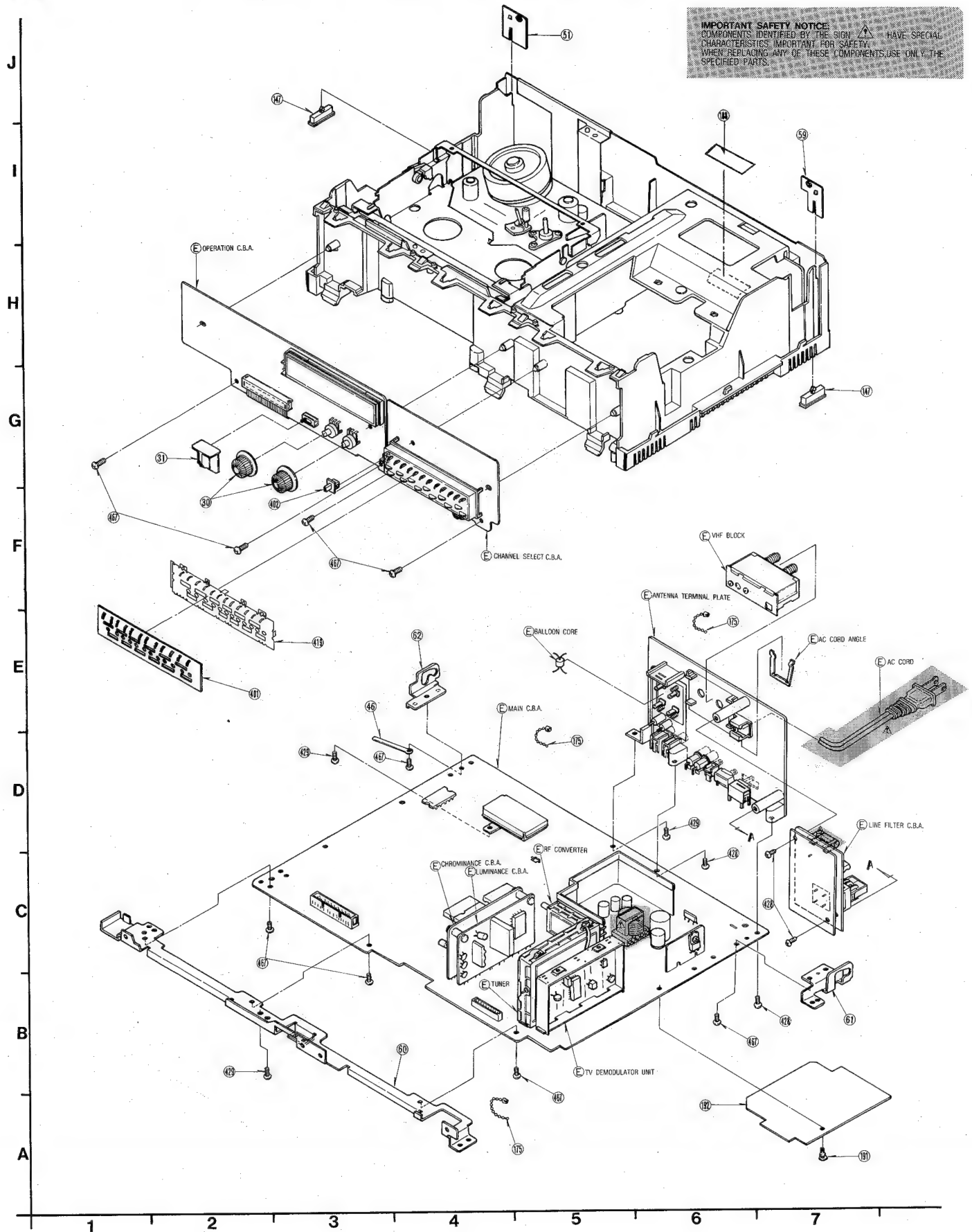


4 Cassette Up Mechanism Section

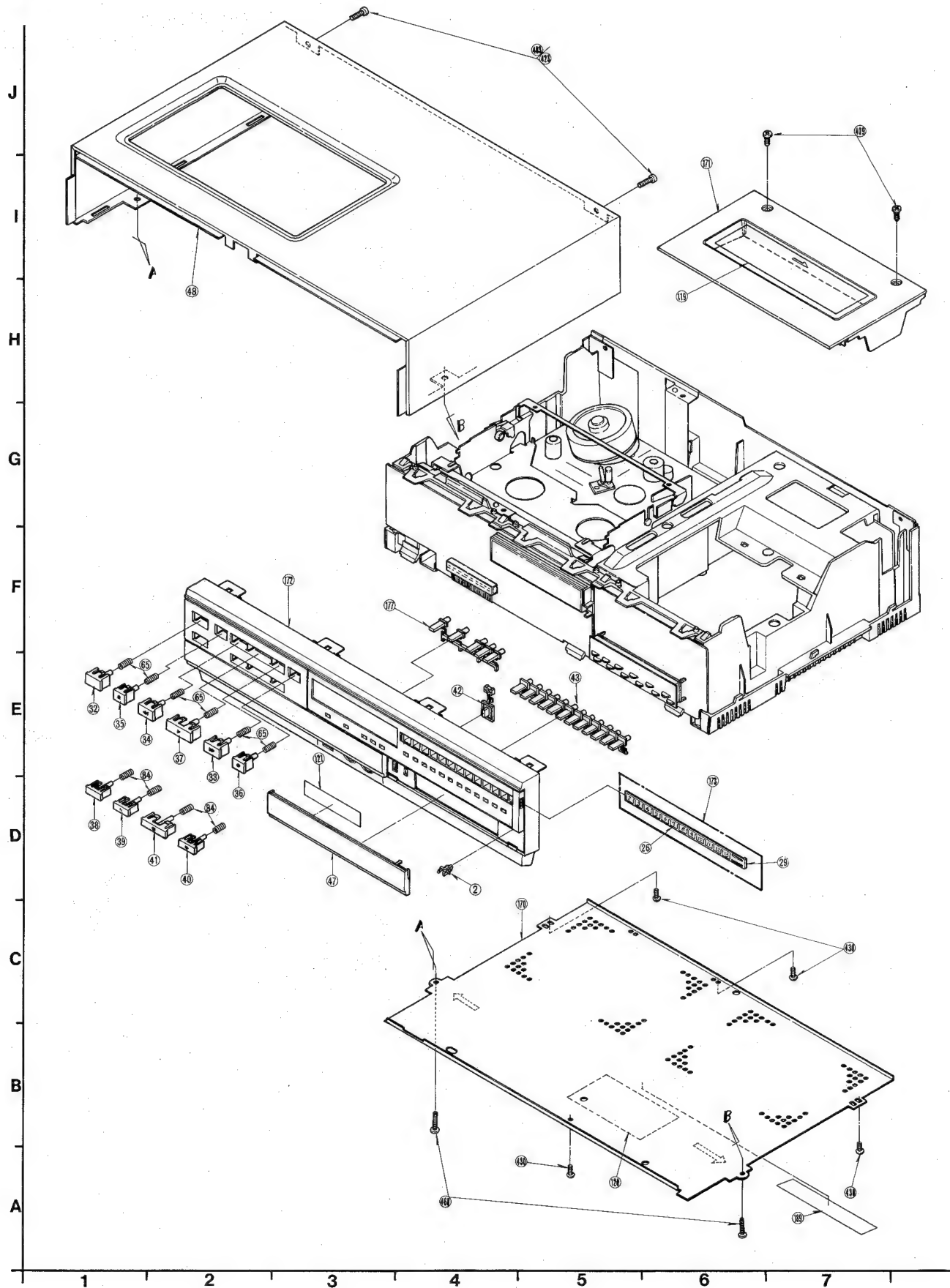


5 Chassis Frame & Tuner Parts Section

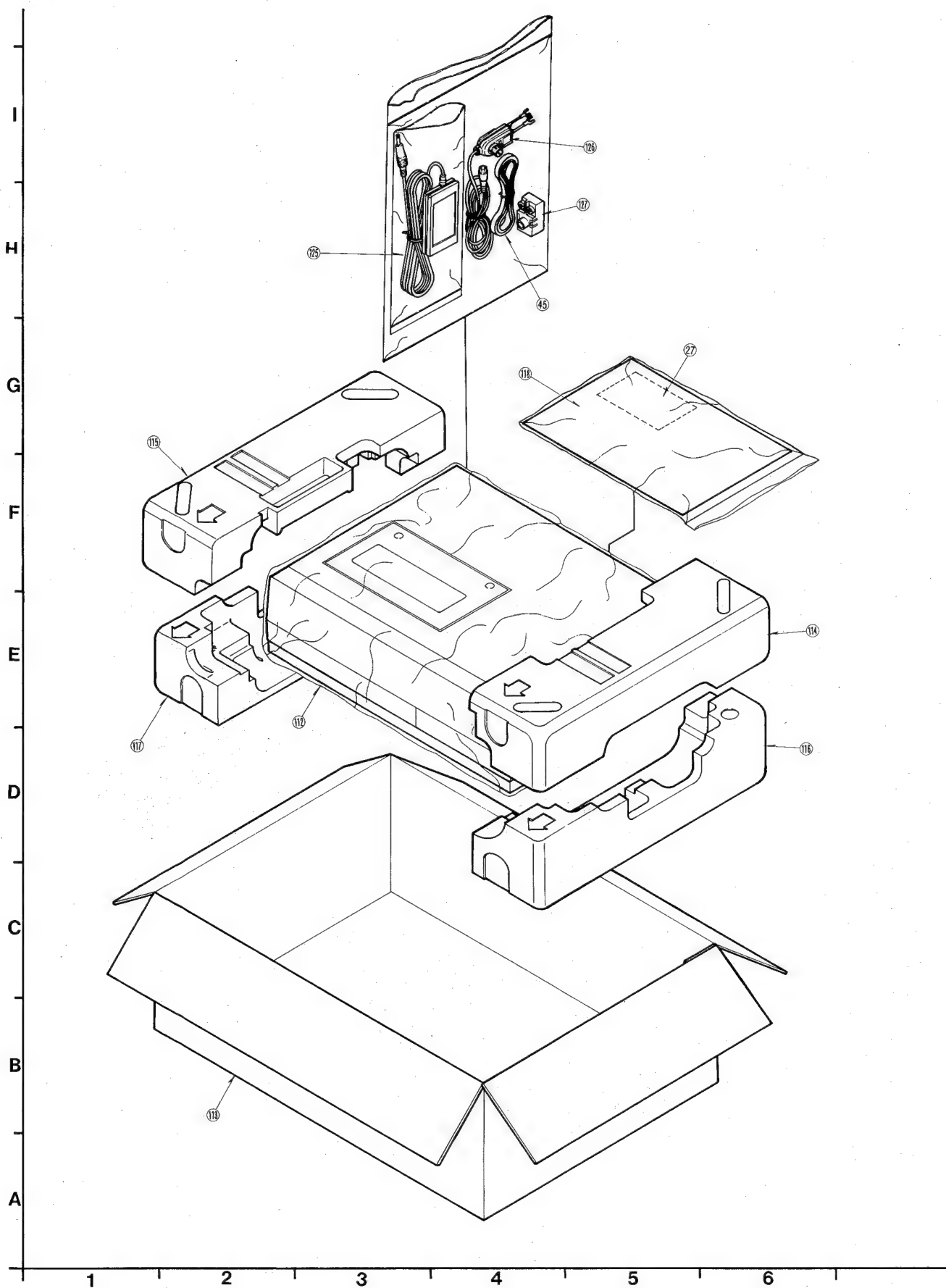
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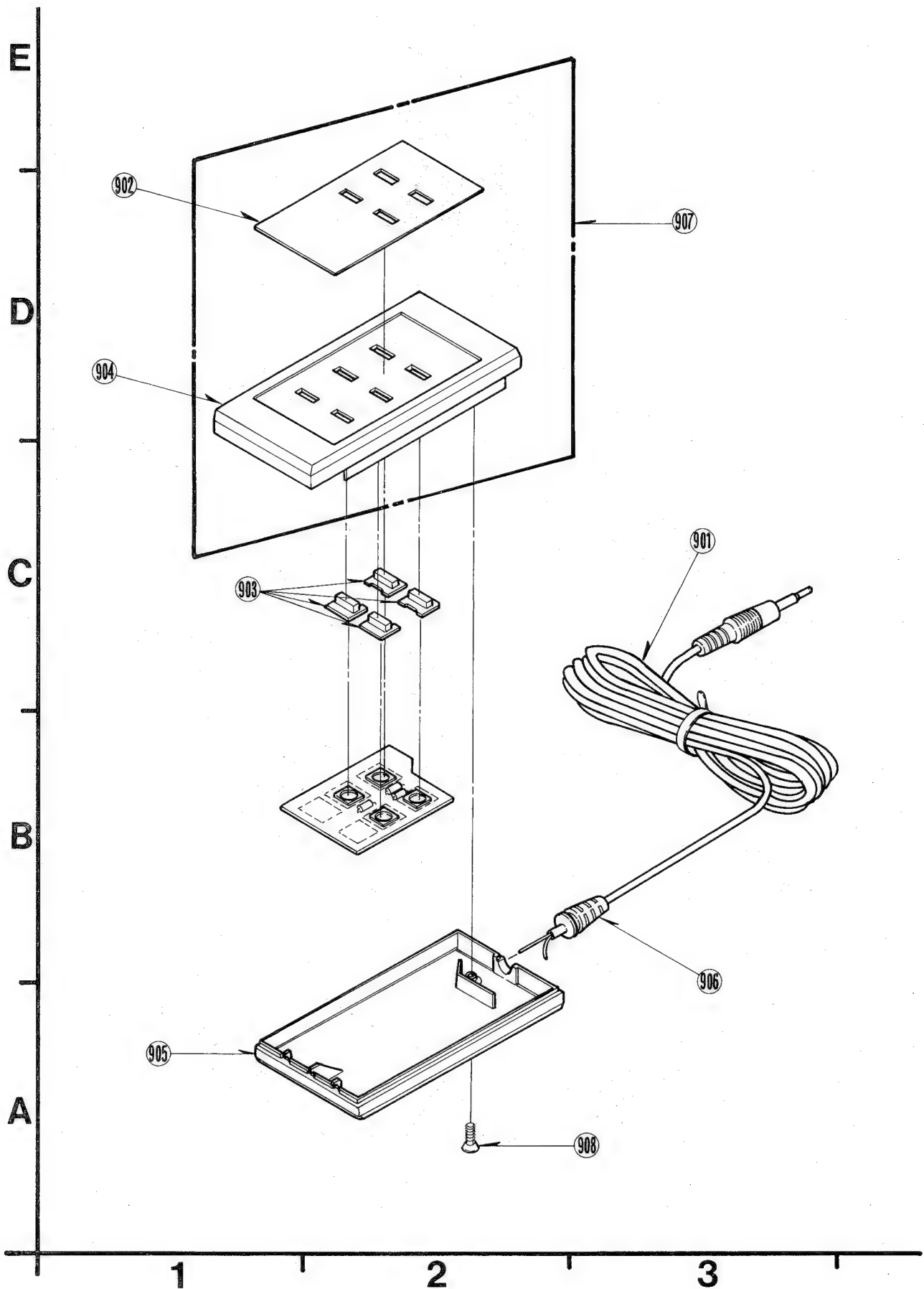
6 Casing Parts Section



7 Packing Parts & Accessories Section



8 Wired Transmitter Unit Section (PV-1230)



MECHANICAL REPLACEMENT PARTS LIST

Model No. PV-1230/PV-1222/PV-1225

Note: Be sure to make your orders of replacement parts according to this list.
(A)=PV-1230, (B)=PV-1222, (C)=PV-1225

Item No.	Drawing No.	Description	Pcs/Set	Part No.	Remark
1	3	CLAMPER	1	SCF-2011S	
2	6	DOOR CLAMPER	1	VGQS0374	
3	1	ERASE HEAD	1	VBS0027	
				OR VBS0030	
4	2	INTERMEDIATE GEAR -1	1	VDGS0038	
5	2	DRIVING GEAR	1	VDGS0039	
6	3	INTERMEDIATE GEAR -2	1	VDGS0040	
7	2	LOADING CAM GEAR	1	VDGS0041	
8	1	IDLER GEAR	1	VDGS0043	
9	1	INTERMEDIATE GEAR -A	1	VDGS0044	
10	3	PULLEY GEAR	1	VDGS0045	
11	1	INTERMEDIATE GEAR -B	1	VDGS0046	
12	2	KICK GEAR -1	1	VDGS0048	
13	2	RELEASE GEAR	1	VDGS0049	
14	2	KICK GEAR -2	1	VDGS0050	
15	4	CASSETTE HOLDER ROLLER	2	VDPS0076	
16	1	CLUTCH PULLEY	1	VDPS0083	
17	1	SUPPLY ROLLER	1	VDPS0091	
18	3	CAPSTAN BELT	1	VDVS0042	
19	3	LOADING BELT	1	VDVS0043	
20	1	D.D CYLINDER UNIT	1	VEGS0054	
21	3	F.G HEAD UNIT	1	VEHS0068	
				OR VEHS0069	
22	1	UPPER CYLINDER UNIT	1	VEHS0071	
23	1	A/C HEAD UNIT	1	VEHS0072	
24	3	CAPSTAN STATOR UNIT	1	VEMS0058	
25	3	LOADING MOTOR UNIT	1	VEMS0059	
26	6	VHF CHANNEL FILM	1	VGKS0545	
27	7	UHF CHANNEL FILM	1	VGKS0683	(A)
27	7		1	VGKS0549	(B),(C)
28	1	LUG ASS'Y	1	VEKS1694	
29	6	FILM HOLDER	1	VGQS0258	
30	5	TRACKING KNOB	2	VGTS0127	
31	5	SPEED SELECT SWITCH KNOB	1	VGTS0134	
32	6	POWER BUTTON	1	VGUS0644	(A)
32	6		1	VGUS0702	(B)
32	6		1	VGUS0773	(C)
33	6	OPERATION BUTTON -F.F	1	VGUS0645	(A)
33	6		1	VGUS0704	(B)
33	6		1	VGUS0777	(C)
34	6	OPERATION BUTTON -REWIND	1	VGUS0646	(A)
34	6		1	VGUS0703	(B)
34	6		1	VGUS0775	(C)
35	6	OPERATION BUTTON -EJECT	1	VGUS0647	(A)
35	6		1	VGUS0705	(B)
35	6		1	VGUS0774	(C)
36	6	OPERATION BUTTON -RECORD	1	VGUS0648	(A)
36	6		1	VGUS0706	(B)
36	6		1	VGUS0929	(C)
37	6	OPERATION BUTTON -PLAY	1	VGUS0649	(A)
37	6		1	VGUS0707	(B)
37	6		1	VGUS0927	(C)
38	6	VCR BUTTON	1	VGUS0650	(A)
38	6		1	VGUS0708	(B)
38	6		1	VGUS0779	(C)
39	6	OPERATION BUTTON -PAUSE	1	VGUS0651	(A)
39	6		1	VGUS0709	(B)

Item No.	Drawing No.	Description	Pcs/Set	Part No.	Remark
39	6		1	VGUS0780	(C)
40	6	OPERATION BUTTON -SLOW	1	VGUS0652	(A)
40	6		1	VGUS0710	(B)
40	6		1	VGUS0782	(C)
41	6	OPERATION BUTTON -STOP	1	VGUS0653	(A)
41	6		1	VGUS0711	(B)
41	6		1	VGUS0931	(C)
42	6	O.T.R BUTTON	1	VGUS0654	
43	6	CHANNEL SELECT BUTTON	1	VGUS0826	
44					
45	7	TWIN LEAD CONNECTOR	1	VJA0102	
46	2,3,5	CLAMPER	4	VJR3	
47	6	TUNING DOOR	1	VKFS0241	(A)
47	6		1	VKFS0254	(B)
47	6		1	VKFS0292	(C)
48	6	TOP COVER	1	VKMS0065	(A)
48	6		1	VKMS0083	(B),(C)
49	1	SHAFT HOLDER PLATE	2	VMA0545	
50	1	CASSETTE OPENER COVER	1	VMA0694	
51	5	TOP COVER ANGLE -L	1	VMA0756	
52	4	CASSETTE COMPARTMENT SUPPORT	1	VMA0850	
		ANGLE -REAR			
53	1	CASSETTE OPENER ANGLE	1	VMA0873	
54	4	TENSION ANGLE	1	VMA0876	
55	3	LOADING MOTOR BRACKET	1	VMA0877	
56	4	TRANSISTOR ANGLE	1	VMA0878	
57	3	THRUST HOLDER	1	VMA0880	
58	2	GROUNDING PLATE	1	VMA0883	
59	5	TOP COVER ANGLE -R	1	VMA0932	
60	5	MAIN C.B.A ANGLE -FRONT	1	VMA0934	
61	5	MAIN C.B.A ANGLE -RIGHT	1	VMA0935	
62	5	MAIN C.B.A ANGLE -LEFT	1	VMA0936	
63	3	TRANSISTOR BRACKET -R	1	VMA1003	
64	1	SUPPLY INERTIA SPRING	1	VMS0071	
65	6	OPERATION BUTTON SPRING	6	VMS0256	
66	4	CASSETTE HOLDING SPRING	2	VMS0259	
67	1	POST SPRING -P,4	1	VMS0288	
68	2	STOPPER SPRING	1	VMS0328	
69	2	EJECT SPRING	1	VMS0329	
70	2	KICK SPRING	1	VMS0330	
71	2	TENSION SPRING	1	VMS0331	
72	4	SOFT BRAKE SPRING	1	VMS0332	
73	2	PRESSURE ROLLER SPRING	1	VMS0334	
74	2	KICK LEVER SPRING	1	VMS0336	
75	2	SUB LEVER SPRING	1	VMS0337	
76	1	CHANGE LEVER SPRING	1	VMS0338	
77	1	IDLER ARM SPRING	1	VMS0339	
78	1	ADJUST SPRING	1	VMS0340	
79	1	SOFT BRAKE SPRING -S	1	VMS0341	
80	1	A/C HEAD SPRING	1	VMS0342	
81	4	HOLDER SPRING -L	1	VMS0343	
82	4	HOLDER SPRING -R	1	VMS0344	
83	1	IDLER SPRING	1	VMS0355	
84	6	OPERATION BUTTON SPRING	4	VMS0410	
85	1	ERASE HEAD LEVER SPRING	1	VMS0373	
86	2	BRAKE ARM SPRING	1	VMS0409	
87	4	DISCRIMINATION LEVER SPRING	1	VMS0395	
88	1	ADJUST SPRING	1	VMS0404	
89	1	LOADING SPRING	2	VMS0669	
90	1	INERTIA ROLLER LIMITER	1	VMS0063	

Item No.	Drawing No.	Description	Pcs/ Set	Part No.	Remark
91	1	POST STOPPER	2	VMD0199	
92	3,4	TRANSISTOR HOLDER	2	VMD0091	
93	3	OIL POOL	1	VMD0104	
94					
95	2	LOCK LEVER	1	VMLS0299	
96	2	EJECT LEVER	1	VMLS0300	
97	1	IDLER ARM -A	1	VMLS0303	
98	1	CHANGE LEVER -B	1	VMLS0305	
99	1	SOFT BRAKE ARM -S	1	VMLS0306	
100	4	SUB ARM -L	1	VMLS0311	
101	4	SUB ARM -R	1	VMLS0312	
102	1	ERASE HEAD LEVER	1	VMLS0350	
103	2	LOCK SLIDE LEVER	1	VMS0010	
104	1	LEVER SHAFT	1	VMSS0381	
105	1	COLLAR	1	VMXS0035	
106	1	POST CAP -P.4	1	VMXS0129	
107	1	LIMITER SUPPORTER	1	VMXS0321	
108	1	SLEEVE	1	VMXS0370	
109	4	LOCK COLLAR	1	VMX0247	
110	3	OIL SEAL	1	VMX0251	
111	1	INERTIA ROLLER UPPER LIMITER	1	VNWS0002	
112	7	POLYETHYLENE BAG	1	VPFS0040	
113	7	PACKING CASE	1	VPGS0873	(A)
113	7		1	VPGS0876	(B)
113	7		1	VPGS0877	(C)
114	7	RIGHT CUSHION -TOP	1	VPNS0149	
115	7	LEFT CUSHION -TOP	1	VPNS0150	
116	7	RIGHT CUSHION -BOTTOM	1	VPNS0151	
117	7	LEFT CUSHION -BOTTOM	1	VPNS0152	
118	7	FAN BAG	1	VQFS0569	(A)
118	7		1	VQFS0572	(B)
118	7		1	VQFS0573	(C)
119	6	STICKER	1	VQLS0928	(A)
119	6		1	VQLS0988	(B),(C)
120	6	BOTTOM CAUTION LABEL	1	VQLS0698	
121	6	TUNING CAUTION LABEL	1	VQLS0871	(A)
121	6		1	VQLS0892	(B),(C)
122	1	SHIELD CASE	1	VSCS0502	
123					
124					
125	7	WIRED TRANSMITTER UNIT	1	VSQS0300	(A)
125	7		1	VSQS0112	(B),(C)
126	7	VHF CONNECTING CABLE	1	VSQS0215	
127	7	VHF ANTENNA ADAPTOR	1	VSQS0198	
128	1	ROLLER POST UNIT	2	OR VSQ0057 VXAS0344 OR VXAS0562	
129					
130	1	LOADING BASE 1 UNIT	1	VXAS0564	
131	1	SHAFT HOLDER BLOCK S UNIT	1	VXAS0565	
132	1	LOADING POST S UNIT	1	VXAS0566	
133	1	SHAFT HOLDER BLOCK T UNIT	1	VXAS0567	
134	1	LOADING POST T UNIT	1	VXAS0568	
135	2	MAIN LEVER UNIT	1	VXAS0569	
136	2	SUB LEVER UNIT	1	VXAS0572	
137	1	CASSETTE OPENER ANGLE UNIT	1	VXAS0573	
138	2	LOCK BASE UNIT	1	VXAS0574	
139	2	CASSETTE LOCK UNIT	1	VXAS0575	
140	2	KICK BASE UNIT	1	VXAS0578	

Item No.	Drawing No.	Description	Pcs/ Set	Part No.	Remark
141	4	SUPPLY PHOTO TR BRACKET UNIT -S	1	VXAS0582	
142	3	SUPPLY PHOTO TR BRACKET UNIT -T	1	VXAS0583	
143	4	CASSETTE HOLDER 1 UNIT	1	VXAS0589	
144	4	CASSETTE UP UNIT	1	VXAS0592	
145	1	GROUNDING PLATE	1	VXBS0019	
146	3	HOUSING	1	VXDS0012	
147	5	CUSHION	2	VXGS0006	
148	1	F.F SLIDE LEVER UNIT	1	VXKS0339	
149	1	LOADING ARM R UNIT	1	VXLS0200	
150	1	LOADING ARM L UNIT	1	VXLS0201	
151	1	CHANGE LEVER -A	1	VXLS0267	
152	1	IDLER ARM -B	1	VXLS0268	
153	2	ARM LEVER	1	VXLS0271	
154	2	ARM LEVER UNIT	1	VXLS0272	
155	2	SECTOR GEAR UNIT	1	VXLS0273	
156	2	PRESSURE ROLLER LEVER UNIT	1	VXLS0278	
157	1	IDLER FRAME UNIT	1	VXPS0116	
158	3	CAPSTAN ROTOR UNIT	1	VXPS0119	
159	1	LOADING GEAR UNIT	2	VXPS0120	
160	2	KICK GEAR UNIT	1	VXPS0121	
161	3	CAPSTAN PULLEY UNIT	1	VXPS0122	
162	1	CLUTCH GEAR UNIT	1	VXPS0124	
163	2	SUPPLY REEL TABLE UNIT	1	OR VXP0134 VXRS0016	
164	2	TAKEUP REEL TABLE UNIT	1	VXRS0017	
165	4	DAMPER	1	VXZS0053	
166	2	BRAKE S UNIT	1	VXZS0055	
167	2	BRAKE T UNIT	1	VXZS0057	
168	2	TENSION ARM UNIT	1	VXLS0276	
169	4	SOFT BRAKE T UNIT	1	VXZS0062	
170	6	BOTTOM PANEL UNIT	1	VYPS0050	
171	6	CASSETTE COVER UNIT	1	VYPS1544	(A)
171	6		1	VYPS1542	(B),(C)
172	6	FRONT PANEL 1 UNIT	1	VYPS1850	(A)
172	6		1	VYPS1937	(B)
172	6		1	VYPS1934	(C)
173	6	FILM HOLDER UNIT	1	VYQS0023	
174	1,3,4	CLAMPER	6	VZFS0006	
175	5	FASTENER	3	WZBV1	
176	1	RETAINING RING C-TYPE 4	4	XUEV4FP	
177	6	TIMER OPERATION BUTTON	1	VGUS0643	
178					
179	1	FASTENER	1	TYB-23M	
180	2	TENSION BAND UNIT	1	VXZS0059	
181	3	CONNECTOR ASS'Y	1	VEKS1426	
182	1	CONNECTOR ASS'Y	1	VEKS1427	
183	1	CONNECTOR ASS'Y	1	VEKS1428	
184	1	CONNECTOR ASS'Y	1	VEKS1429	
185	2	CHANGE GEAR	1	VDGS0042	
186	2	KICK LEVER 1 UNIT	1	VXLS0275	
187	2	SELECT GEAR LEVER SPRING	1	VMBS0333	
188	5	FUSE CAUTION LABEL	1	VQLS0768	
189	6	TOP COVER CAUTION LABEL	1	VQLS0995	
190					
191	5	CLIP	1	VHN0011-T	
192	5	BARRIER	1	VMZS0101	

Item No.	Drawing No.	Description	Pcs/Set	Part No.	Remark	Item No.	Drawing No.	Description	Pcs/Set	Part No.	Remark
401	5	TUNING V.R DECORATION	1	VGNS0783		458	3	SCREW WITH WASHER 2.6X33	2	XYN26+C33	
402	5	SLIDE SWITCH KNOB -B	1	VGTS0118		459	1	SCREW WITH WASHER 3X4	2	XYN3+C4	
403	6	SCREW	2	VHDS0011		460	3,4	SCREW WITH WASHER 3X8	2	XYN3+E8S	
404	1	SCREW	3	VHDS0016							
405	1	LOCK SCREW	2	VHDS0024		461	1	SCREW WITH WASHER 3X16	4	XYN3+F16	
				OR VHDS0052		462	2,4	SCREW WITH WASHER 3X8	2	XYN3+FF8	
						463	1	SCREW WITH WASHER 3X8	1	XYNV3+K8	
406	1	SCREW	1	VHDS0057		464	1	ADJUST SCREW	1	VHDS0041	
407	1	SCREW WITH WASHER	2	VHDS0032		465	1	SCREW 3X10	1	XSN3D10F	
408	1	SCREW	1	VHDS0045							
409	6	CASSETTE COVER SCREW	2	VHDS0055		466	4	RETAINING RING E-TYPE 5	1	XUC5FF	
410	1	ADJUST NUT -3	1	VHNS0019		467	5	TAPPING SCREW 3X8	9	XTV3+8	
				OR VHNS0023		468	6	TAPPING SCREW 3X25	2	XTV3+25AK	
						469	2	SCREW WITH WASHER 3X8	1	XYE3+FF8	
411	1	IDLER ANGLE	1	VMAS0872		470	2	SUB LEVER CUSHION	1	VMDS0243	
412	2	SLIDE WASHER	3	VMXS0050							
413	2	SLIDE WASHER F	3	VMXS0109		471	1	TAPPING SCREW 2.6X6	1	XTV26+6F	
414	2	WASHER	1	VMXS0335							
415	1,2	CUT WASHER	8	VMXS0336 *							
416	2	CUT WASHER	1	VMXS0342 *							
417	3	THRUST SCREW	1	VMX0211							
418	3	CAPSTAN THRUST WASHER	1	VMX0265							
419	5	TUNING V.R GROUNDING PLATE	1	VSCS0392		901	8	REMOTE CONTROL CABLE	1	VECS0101	(A)
420	1	M3 NUT	1	XNG3E		902	8	REMOTE CONTROL CASE DECORATION	1	VGKS0626	(A)
						903	8	REMOTE CONTROL BUTTON	4	VGUS0948	(A)
421	1	M3 NUT	1	XNG3EZU		904	8	REMOTE CONTROL CASE -TOP	1	VKMS0066	(A)
422	1	WASHER 5	1	XNG5E		905	8	REMOTE CONTROL CASE -BOTTOM	1	VKMS0073	(A)
423	6	BIND SCREW 4X12	2	XSB4+12KS							
424	3	TAPPING SCREW 4X18	1	XTN4+18G		906	8	BUSHING	1	VVRS0017	(A)
425	2	SCREW WITH WASHER 2X8	1	XYE2+CF8		907	8	REMOTE CONTROL CASE TOP UNIT	1	VYBS0118	(A)
						908	8	TAPPING SCREW 2.6X10	1	XTS26+10BFZ	(A)
426	4	TAPPING SCREW 2.6X6	1	XTV26+6FS							
427	4	TAPPING SCREW 3X8	1	XTN3+8F							
428	5	TAPPING SCREW 3X10	4	XTV3+10G							
429	5	TAPPING SCREW 3X12	3	XTV3+12AR							
430	6	TAPPING SCREW 3X12	4	XTV3+12AK							
431	3	TAPPING SCREW 3X15	1	XTV3+15F				SERVICING FIXTURES & TOOLS			
432	1,2,3	TAPPING SCREW 3X6	6	XTV3+6F				VHS ALIGNMENT TAPE		VFMS0001H6	
433	4	TAPPING SCREW 3X6	2	XTV3+6FS				DIAL TORQUE GAUGE		VFK0133	
434	1,2,3,4	TAPPING SCREW 3X8	31	XTV3+8F				PLASTIC CLAMPER		VFK0180	
435	4	TAPPING SCREW 4X30	2	XTB4+30G				ADAPTOR FOR VFK0133		VFK0134	
								FINE ADJ. SCREWDRIVER (for 3mmø Long Shaft)		VFK0136	
436	1,4	RETAINING RING E-TYPE 1.5	3	XUC15FP							
437	1,2	RETAINING RING E-TYPE 2.5	5	XUC25FP							
438	4	RETAINING RING E-TYPE 3	6	XUC3FP				POST ADJ. SCREWDRIVER		VFK0137	
439	4	RETAINING RING E-TYPE 4	1	XUC4FP				POST ADJ. PLATE		VFKS0010	
440	2,3	RETAINING RING C-TYPE 3	8	XUEV3VW				REEL TABLE HEIGHT FIXTURE		VFKS0009	
								TENSION POST ADJ. PLATE		VFKS0002	
441	1,2,4	RETAINING RING C-TYPE 4	13	XUEV4VW				H-POSITION ADJ. FIXTURE		VFKS0003	
442	1	POLY SLIDER WASHER 2	1	XWGV2D5G							
443	1	POLY SLIDER WASHER 3	1	XWGV3D12G				V - HOLD ADJ. TOOL		VFKS0031	
444	1,2	POLY SLIDER WASHER 3	4	XWGV3D54G				CASSETTE HOLDER FIXTURE		VFKS0004	
445	1	WASHER 5	1	XWG5J12				V-STOPPER ADJ. FIXTURE		VFKS0029	
								RETAINING RING REMOVER (for 3mmø)		VFK0144	
446	2	POLY SLIDER WASHER 3	1	XWV3A54	(t=0.25)			RETAINING RING REMOVER (for 4mmø)		VFK0145	
447	2	POLY SLIDER WASHER 3	1	XWV3A8	(t=0.25)						
448	1,2,3	POLY SLIDER WASHER 3	11	XWV3D54	(t=0.5)						
449	2	POLY SLIDER WASHER 3	1	XWV3D8	(t=0.5)						
450	2	POLY SLIDER WASHER 3	1	XWV3Z54	(t=0.13)			HEX. WRENCH (for 1.5mmø)		VFK76	
								HEAD CLEANING STICK		VFK27	
451	2	POLY SLIDER WASHER 3	1	XWV3Z8	(t=0.13)			MOLYTONE GREASE		MOR265	
452	3	POLY SLIDER WASHER 3	1	XWV3D6				LOCK SCREW WRENCH		VFKS0032	
453	2	POLY SLIDER WASHER 4	2	XWV4D11							
454	1,2,4	POLY SLIDER WASHER 4	10	XWV4D9							
455	1	SCREW WITH WASHER 2.6X8	1	XYC26+CJ8							
456	3	SCREW WITH WASHER 3X8	2	XYC3+FF8							
457	2	SCREW WITH WASHER 3X10	3	XYE3+FF10							

* This cut washer is not reusable. If removed, reinstall a new one.

ELECTRICAL REPLACEMENT PARTS LIST

Model No. PV-1230/PV-1222/PV-1225

Special Note:

All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "Electrostatically Sensitive (ES) Devices" section of this service manual.

Note:

1. Be sure to make your orders of replacement parts according to this list.

2. IMPORTANT SAFETY NOTICE

Components identified by the sign  have special characteristics important for safety. When replacing any of these components, use only the specified parts.

3. Unless otherwise specified:

All resistors are in OHMS (Ω), 1/4W, ± 5% carbon, K=1,000Ω, M=1,000KΩ.



All capacitors are in MICROFARADS (UF), ± 10% P=UUF.




All coils are in MICROHENRIES (UH), M=10³U, ± 10%.

4. C.B.A: Circuit Board Assembly.

5. P.C.B: Print Circuit Board.

(A)=PV-1230, (B)=PV-1222, (C)=PV-1225

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		PRINTED CIRCUIT BOARD ASSEMBLY		
	VEPS0336A1	MAIN C.B.A	1	(A)
	VEPS0336C1		1	(B), (C)
	VEPS06100A	OPERATION C.B.A	1	(A), (C)
	VEPS06100C		1	(B)
	VEPS0798B	CHANNEL SELECT C.B.A	1	(A), (C)
	VEPS0798A		1	(B)
	VEPS0243A1	CAPSTAN MOTOR DRIVE C.B.A	1	
	VEPS00286A	LINE FILTER C.B.A	1	
	VEPS0337A	LUMINANCE C.B.A	1	
	VEPS0806A	CHROMINANCE C.B.A	1	
	VEQS0257	TV DEMODULATOR UNIT	1	
		MAIN C.B.A		
		INTEGRATED CIRCUITS		
IC1001	TLP521-YG		1	
	OR ON3111			
IC2001	AN6359		1	
	OR AN6359N			
IC2002	MN6168VIB		1	
IC2003	AN6356N		1	
IC2004	AN6387		1	
IC2005	M54802P		1	
IC2006	AN1358		1	
	OR HA17358			
	OR UPC358C			
IC3001	AN6307		1	
IC3002	AN3312		1	
IC4001	UPC1514CA		1	
IC4002	TA7361P		1	
	OR UPC1513HA			
	OR UPC1519HA			
IC4003	AN90C22		1	
IC6001	MN15843VRA		1	
IC6003	M54543L		1	
IC7001	AN5070		1	
		TRANSISTORS		
Q1001	 2SD1330		1	
Q1002	2SB976		1	
Q1003	2SB642		1	
Q1004	 2SC3170		1	
	OR 2SC3310			
Q1006	2SD1273		1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
Q1007	2SD637		1	
Q1009	2SD636		1	
Q1010-1012	2SB642		3	
Q1013	2SD638(Q,R)		1	
Q2001	2SA937M(R)		1	
	OR			
	2SB641(Q,R,S)			
Q2002,2003	2SC2021M(R)		2	
	OR			
	2SD636(Q,R,S)			
Q2004	2SA937M(R)		1	
	OR			
	2SB641(Q,R,S)			
Q2005	2SD1266(P,Q,R)		1	
	OR			
	2SD856(P,Q,R)			
Q3001-3003	2SD636(Q,R,S)		3	
Q3004	2SB641(Q,R,S)		1	
Q3005	2SD636(Q,R,S)		1	
Q3006	2SB641(Q,R,S)		1	
Q3007	2SC1684(Q,R,S)		1	
Q4001	2SC2021M(R,S)		1	
	OR			
	2SD636(Q,R,S)			
Q4002	2SA950(Y)		1	
	OR 2SB643(R,S)			
Q4003	2SD637(Q,R,S)		1	
Q4004	2SC2021M(R,S)		1	
	OR			
	2SD636(Q,R,S)			
Q6001-6005	2SC2021M(R,S)		5	
	OR			
	2SD636(Q,R,S)			
Q6009	2SD638(Q,R,S)		1	
Q6010-6013	2SC2021M(R,S)		4	
	OR			
	2SD636(Q,R,S)			
Q6016	2SA937M(R,S)		1	
	OR			
	2SB641(Q,R,S)			
Q6017-6019	2SC2021M(R,S)		3	
	OR			
	2SD636(Q,R,S)			
Q7002-7010	2SD637(Q,R,S)		9	
		DIODES		
D1001	 31VP40		1	
	OR 1G4B41			
D1002	 D1A100		1	
D1003-1005	MA165		3	
D1006	MA4130L	ZENER	1	
D1007	MA170		1	
D1008	MA165		1	
D1009	 MA167		1	
D1010	D1K40		1	
	OR ERB43-04			
	OR MA182			
D1011	ERC47-02		1	
	OR RU3M			
	OR S2K20			
D1012	D1K40		1	
	OR ERB43-04			
	OR MA182			
D1013	MA4068M	ZENER	1	
D1014	MA165		1	
D1015	EK-04	ZENER	1	
	OR ERA81-004			
D1019	MA4051M	ZENER	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
D1020	MA165		1	
D1021	MA4053N	ZENER	1	
D1022	MA4120H	ZENER	1	
D1023, 1024	MA165		2	
D1025	ERB43-04		1	
	OR S1K40			
D2004-2007	MA165		4	
	OR 1SS119			
D2009-2011	MA165		3	
	OR 1SS119			
D3001	MA165		1	
D3004	MA165		1	
D3005	EQA02-10-C	ZENER	1	
	OR EQA02-10-D	ZENER		
	OR RD11EB	ZENER		
D3007	MA165		1	
D6001-6009	MA166		9	
D6011-6013	MA166		3	
D6015	EQA02-05-A	ZENER	1	
	OR EQA02-05-B	ZENER		
	OR MA1047	ZENER		
	OR RD4.7EB	ZENER		
D6018-6025	MA165		8	
	OR 1SS119			
D6030-6032	MA165		3	
	OR 1SS119			
D6034	MA165		1	
	OR 1SS119			
D6035	MA1030	ZENER	1	
	OR MA1033	ZENER		
	OR MA1036	ZENER		
	OR RD3.0EB	ZENER		
	OR RD3.3EB	ZENER		
	OR RD3.6EL	ZENER		
D6042, 6043	MA165		2	
	OR 1SS119			
D6046-6050	MA165		5	
	OR 1SS119			
D7002	MA165		1	
	OR 1SS119			
D7004, 7005	MA165		2	
	OR 1SS119			
D7006	MA4100H	ZENER	1	
		RESISTORS		
RX6001	EXB-X14E473K	COMPLEX COMPONENT 1/2W 47K	1	
	OR RGLS12T473J	COMPLEX COMPONENT 1/2W 47K		
R1001	ERDS2TJ334		330K 1	
R1002	ERG3AN1333	METAL OXIDE 3W	33K 1	
R1003	ERD25FJ6R2		6.2 1	
R1004	ERD25FJ222		2.2K 1	
R1005	ERD25FJ152		1.5K 1	
R1006	ERD25FJ4R7		4.7 1	
R1007	ERD25FJ150		15 1	
R1008	ERD25FJ472		4.7K 1	
R1009	ERDS2TJ471		470 1	
R1010	ERD25FJ560		56 1	
R1011	ERD25FJ330		33 1	
R1012	ERDS2TJ331		330 1	
R1013	ERDS2TJ104		100K 1	
R1015	ERDS1TJ180		1/2W 18 1	
R1017	ERDS2TJ221		220 1	
R1018	ERDS2TJ562		5.6K 1	
R1019	ERDS2TJ103		10K 1	
R1020	ERDS2TJ562		5.6K 1	
R1021	ERDS2TJ221		220 1	
R1022	ERDS2TJ3R3		3.3 1	
R1023	ERDS1FJ1R0		1/2W 1 1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R1024	ERDS2TJ560		56 1	
R1026	ERDS2TJ472		4.7K 1	
R1027, 1028	ERDS2TJ104		100K 2	
R1029	ERDS2TJ103		10K 1	
R1030	ERD25FJ220		22 1	
R1033	ERD25FJ472		4.7K 1	
R1034	ERDS2TJ334		330K 1	
R1037	ERDS2TJ562		5.6K 1	
R1038	ERDS2TJ471		470 1	
R1039	ERD25FJ330		33 1	
R2002	ERDS2TJ334		330K 1	
R2003	ERDS2TJ272		2.7K 1	
R2004	ERDS2TJ393		39K 1	
R2005	ERDS2TJ103		10K 1	
R2006	ERDS2TJ223		22K 1	
R2007	ERDS2TJ104		100K 1	
R2008	ERDS2TJ333		33K 1	
R2009	ERDS2TJ154		150K 1	
R2010	ERDS2TJ272		2.7K 1	
R2011	ERDS2TJ124		120K 1	
R2013, 2014	ERDS2TJ154		150K 2	
R2015	ERDS2TJ274		270K 1	
R2016	ERDS2TJ473		47K 1	
R2017	ERDS2TJ822		8.2K 1	
R2018	ERDS2TJ102		1K 1	
R2019	EVN38CA00B15	VARIABLE	100K 1	
R2020	ERDS2TJ562		5.6K 1	
R2021	ERDS2TJ474		470K 1	
R2022	AVNE4AA0B473	VARIABLE	47K 1	
	OR			
	EVNE4AA00B54	VARIABLE	50K	
R2025	ERDS2TJ222		2.2K 1	
R2026	ERDS2TJ181		180 1	
R2029-2031	ERDS2TJ470		47 3	
R2032	ERDS2TJ104		100K 1	
R2033	ERDS2TJ182		1.8K 1	
R2034	ERDS2TJ682		6.8K 1	
R2035	ERX12AMJR56		1/2W 0.56 1	
R2036	ERDS2TJ124		120K 1	
R2037	ERDS2TJ683		68K 1	
R2038	ERDS2TJ223		22K 1	
R2039-2041	ERDS2TJ103		10K 3	
R2042	ERDS2TJ105		1M 1	
R2043	ERDS2TJ102		1K 1	
R2044	ERDS2TJ472		4.7K 1	
R2045	ERDS2TJ103		10K 1	
R2046	ERDS2TJ333		33K 1	
R2047	ERDS2TJ124		120K 1	
R2048	ERDS2TJ103		10K 1	
R2049	ERDS2TJ273		27K 1	
R2050, 2051	ERDS2TJ332		3.3K 2	
R2052	ERDS2TJ224		220K 1	
R2053	ERDS2TJ152		1.5K 1	
R2054	ERDS2TJ392		3.9K 1	
R2055	ERDS2TJ682		6.8K 1	
R2063-2065	ERDS2TJ103		10K 3	
R2066	ERDS2TJ472		4.7K 1	
R2068	ERDS2TJ822		8.2K 1	
R2069	ERDS2TJ101		100 1	
R2070	ERDS2TJ103		10K 1	
R3001	EVNE4AA00B23	VARIABLE	2K 1	
R3002	ERDS2TJ821		820 1	
R3003	ERDS2TJ122		1.2K 1	
R3004	ERDS2TJ222		2.2K 1	
R3005	ERDS2TJ681		680 1	
R3006	ERDS2TJ471		470 1	
R3007	ERDS2TJ331		330 1	
R3008	ERDS2TJ151		150 1	
R3009, 3010	ERDS2TJ100		10 2	
R3011, 3012	ERDS2TJ102		1K 2	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R3013,3014	ERDS2TJ821		820 2	
R3015	ERDS2TJ181		180 1	
R3016	EVNE4AA00B13	VARIABLE	1K 1	
R3017	ERDS2TJ152		1.5K 1	
R3018	ERDS2TJ102		1K 1	
R3019	ERDS2TJ392		3.9K 1	
R3020,3021	ERDS2TJ102		1K 2	
R3022	ERDS2TJ271		270 1	
R3023	ERDS2TJ223		22K 1	
R3024,3025	ERDS2TJ103		10K 2	
R3026	ERDS2TJ123		12K 1	
R3028	ERDS2TJ103		10K 1	
R3029	ERDS2TJ562		5.6K 1	
R3030,3031	ERDS2TJ103		10K 2	
R3032,3033	ERDS2TJ563		56K 2	
R3034	ERDS2TJ471		470 1	
R3035	ERDS2TJ750		75 1	
R3036	ERDS2TJ102		1K 1	
R3037	ERDS2TJ561		560 1	
R3038	ERDS2TJ820		82 1	
R3039	ERDS2TJ822		8.2K 1	
R3040	ERDS2TJ103		10K 1	
R3041	ERDS2TJ820		82 1	
R3047	ERDS2TJ393		39K 1	
R3048	ERDS2TJ562		5.6K 1	
R3051	ERDS2TJ102		1K 1	
R3052	ERDS2TJ393		39K 1	
R3053	ERDS2TJ184		180K 1	
R3054	ERDS2TJ562		5.6K 1	
R3055	ERDS2TJ101		100 1	
R3056	ERDS2TJ102		1K 1	
R4001	ERDS2TJ333		33K 1	
R4002	ERDS2TJ124		120K 1	
R4003	ERDS2TJ101		100 1	
R4004	AVNE4AA0B472	VARIABLE	4.7K 1	
	OR			
	EVNE4AA00B53	VARIABLE	5K	
R4005	ERDS2TJ102		1K 1	
R4007	AVNE4AA00B23	VARIABLE	2K 1	
	OR			
	EVNE4AA00B23	VARIABLE	2K	
R4008	ERDS2TJ103		10K 1	
R4009	ERDS2TJ563		56K 1	
R4010	ERDS2TJ332		3.3K 1	
R4011,4012	ERDS2TJ223		22K 2	
R4013	ERDS2TJ221		220 1	
R4014	ERDS2TJ182		1.8K 1	
R4015	ERDS2TJ225		2.2M 1	
R4016	ERDS2TJ183		18K 1	
R4017	ERDS2TJ223		22K 1	
R4018	ERDS2TJ470		47 1	
R4019	ERDS2TJ221		220 1	
R4020	ERDS2TJ331		330 1	
R4021	ERDS2TJ470		47 1	
R4022	ERDS2TJ182		1.8K 1	
R4023	ERDS2TJ472		4.7K 1	
R4024	ERDS2TJ562		5.6K 1	
R4025	AVNE4AA00B15	VARIABLE	100K 1	
	OR			
	EVNE4AA00B15	VARIABLE	100K	
R4026	ERDS2TJ223		22K 1	
R4027	ERDS2TJ470		47 1	
R4028	ERDS2TJ561		560 1	
R4029	ERDS2TJ101		100 1	
R4030-4032	ERDS2TJ472		4.7K 3	
R4033	ERDS2TJ101		100 1	
R6001	ERDS2TJ474		470K 1	
R6014-6016	ERDS2TJ101		100 3	
R6017-6019	ERDS2TJ103		10K 3	
R6030-6032	ERDS2TJ103		10K 3	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R6034	ERDS2TJ472		4.7K 1	
R6035,6036	ERDS2TJ223		22K 2	
R6037	ERDS2TJ103		10K 1	
R6038	ERDS2TJ471		470 1	
R6039,6040	ERDS2TJ472		4.7K 2	
R6041,6042	ERDS2TJ153		15K 2	
R6045	EROS2TKG1101	PRECISION METAL FILM 1.1K +-2%	1	
R6046	ERDS2TJ332		3.3K 1	
R6047	ERDS2TJ113		11K 1	
R6048,6049	ERDS2TJ224		220K 2	
R6050	ERDS2TJ223		22K 1	
R6051,6052	ERDS2TJ104		100K 2	
R6053,6054	ERDS2TJ472		4.7K 2	
R6055	EROS2TKG4701	PRECISION METAL FILM 4.7K +-2%	1	
R6056	ERDS2TJ303		30K 1	
R6057	ERDS2TJ683		68K 1	
R6058	ERDS2TJ123		12K 1	
R6059,6060	ERDS2TJ221		220 +-2%	2
R6062	ERDS1TJ2R7		1/2W 2.7	1
R6063	ERDS2TJ681		680 1	
R6067	ERDS2TJ103		10K 1	
R6069,6070	ERDS2TJ102		1K 2	
R6071	ERDS2TJ474		470K 1	
R6072	ERDS2TJ223		22K 1	
R6073	ERDS2TJ333		33K 1	
R6074	ERDS2TJ274		270K 1	
R6075	ERDS2TJ102		1K 1	
R6076	ERDS2TJ274		270K 1	
R6077	ERDS1TJ101		1/2W 100	1
R6078	ERDS2TJ122		1.2K 1	
R6079	ERDS2TJ223		22K 1	
R6080	ERDS2TJ473		47K 1	
R6081-6087	ERDS2TJ562		5.6K 7	
R6088,6089	ERDS2TJ182		1.8K 2	
R6090	ERDS2TJ562		5.6K 1	
R6092-6094	ERDS2TJ222		2.2K 3	
R6095	ERDS2TJ102		1K 1	
R6096	ERDS2TJ822		8.2K 1	
R6104	ERDS2TJ271		270 1	
R6112-6118	ERDS2TJ221		220 7	
R6122,6123	ERDS2TJ332		3.3K 2	
R6125	EROS2TKG2202	PRECISION METAL FILM 22K +-2%	1	
R6128	ERDS2TJ152		1.5K 1	FOR PV-1230
R6129	ERDS2TJ102		1K 1	FOR PV-1222,PV-1225
R6130	ERDS2TJ103		10K 1	
R6133	ERDS2TJ102		1K 1	
R6134	ERDS2TJ472		4.7K 1	
R6135	ERDS2TJ104		100K 1	
R6136	ERDS2TJ472		4.7K 1	
R6138	ERDS2TJ101		100 1	
R6139-6144	ERDS2TJ102		1K 6	
R6145	ERDS2TJ472		4.7K 1	
R6146	ERDS2TJ104		100K 1	
R6147	ERDS2TJ101		100 1	
R6148	ERDS2TJ103		10K 1	
R6149	ERDS2TJ473		47K 1	
R6150	ERDS2TJ472		4.7K 1	
R6151	ERDS2TJ102		1K 1	
R7003,7004	ERDS2TJ103		10K 2	
R7005	ERDS2TJ472		4.7K 1	
R7006	ERDS2TJ105		1M 1	
R7007	ERDS2TJ273		27K 1	
R7008	ERDS2TJ681		680 1	
R7009	ERDS2TJ104		100K 1	
R7011	ERDS2TJ561		560 1	
R7012	ERDS2TJ153		15K 1	
R7013	ERDS2TJ224		220K 1	
R7014	ERDS2TJ563		56K 1	
R7015	ERDS2TJ223		22K 1	
R7016	ERDS2TJ562		5.6K 1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R7017	ERDS2TJ333	33K	1	
R7018	ERDS2TJ472	4.7K	1	
R7019	ERDS2TJ104	100K	1	
R7020	ERDS2TJ102	1K	1	
R7021,7022	ERDS2TJ473	47K	2	
R7023	ERDS2TJ104	100K	1	
R7024	EROS2TKG1203	PRECISION METAL FILM 120K $\pm 2\%$	1	
R7025	EROS2TKG6802	PRECISION METAL FILM 68K $\pm 2\%$	1	
R7026	ERDS2TJ393	39K	1	
R7027	ERDS2TJ681	680	1	
R7028	AVNE4AA0B102	VARIABLE	1K	
	OR			
	EVNE4AA0B13	VARIABLE	1K	
R7029	ERDS2TJ563	56K	1	
R7030	ERDS2TJ123	12K	1	
R7031	ERDS2TJ153	15K	1	
R7032,7033	ERDS2TJ104	100K	2	
R7034	ERDS2TJ822	8.2K	1	
R7035-7037	ERDS2TJ104	100K	3	
R7039	ERDS2TJ104	100K	1	
R7040	ERDS2TJ151	150	1	
R7041	ERDS2TJ221	220	1	
R7042	ERDS2TJ101	100	1	
		CAPACITORS		
CX6001	EXFP54722L	COMPLEX COMPONENT 50V 0.0047	1	
		$\pm 80\% - 20\%$		
CX6002	EXFP7101ML	COMPLEX COMPONENT 50V 100P	1	
		$\pm 20\%$		
C1003,1004	VCKS0001	CERAMIC 0.001	2	
C1005	ECEA2DS121M	ELECTROLYTIC 200V 120	1	
C1006	KM250VB487	ELECTROLYTIC 250V 4.7	1	
C1007	KMA16VB-22	ELECTROLYTIC 16V 22	1	
C1008	VCKS0001	CERAMIC 0.001	1	
C1009	KM50VB-22	ELECTROLYTIC 50V 22	1	
C1010	KM50VB-2.2	ELECTROLYTIC 50V 2.2	1	
C1011	ECQM1H153JZ	POLYESTER 50V 0.015 $\pm 5\%$	1	
	OR ECQV05153JZ	POLYESTER 50V 0.015 $\pm 5\%$		
	OR ECQV1H153JZ	POLYESTER 50V 0.015 $\pm 5\%$		
C1012	SXE50VB-47	ELECTROLYTIC 50V 47	1	
C1013	ECEA1QC22S	ELECTROLYTIC 16V 2200	1	
	OR SXE16VB2200	ELECTROLYTIC 16V 2200		
C1014	ECEA1QC22S	ELECTROLYTIC 16V 2200	1	
	OR ECEA1CU222	ELECTROLYTIC 16V 2200		
	OR SXE16VB2200	ELECTROLYTIC 16V 2200		
C1015	SXE50VB-47	ELECTROLYTIC 50V 47	1	
C1016	ECEA0JG102S	ELECTROLYTIC 6.3V 1000	1	
	OR SXE6VB1200	ELECTROLYTIC 6V 1200		
C1017	ECEA0JS102	ELECTROLYTIC 6.3V 1000	1	
	OR ECEA0JU102	ELECTROLYTIC 6.3V 1000		
C1019,1020	ECQM1H103KV	POLYESTER 50V 0.01	2	
	OR ECQM1H103KZ	POLYESTER 50V 0.01		
C1021	KM16VB-10	ELECTROLYTIC 16V 10	1	
C1022,1023	ECKW1H103ZF5	CERAMIC 50V 0.01	2	
		$\pm 80\% - 20\%$		
C1024	ECKW1H102KB5	CERAMIC 50V 0.001	1	
C1025-1027	ECKW1H103ZF5	CERAMIC 50V 0.01	3	
		$\pm 80\% - 20\%$		
C1028	KM6.3VB100	ELECTROLYTIC 6.3V 100	1	
C1029	ECEA1CS100	ELECTROLYTIC 16V 10	1	
C1030	ECKW1H221KB5	CERAMIC 50V 220P	1	
C1031	ECKD3D471KB	CERAMIC 2KV 470P	1	
C2001	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
C2002	VCYSACR103MY	CERAMIC 16V 0.01 $\pm 20\%$	1	
C2003	ECQM1H103KV	POLYESTER 50V 0.01	1	
	OR ECQM1H103KZ	POLYESTER 50V 0.01		
C2004	ECEA1EN3R3S	ELECTROLYTIC 25V 3.3	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C2005,2006	VCYSACR562NX	CERAMIC 16V 0.0056 $\pm 30\%$	2	
C2007	ECEA1HS0R1	ELECTROLYTIC 50V 0.1	1	
	OR ECEA1HU0R1	ELECTROLYTIC 50V 0.1		
C2008	ECEA0JK101	ELECTROLYTIC 6.3V 100	1	
C2009	VCYSACR103MY	CERAMIC 16V 0.01 $\pm 20\%$	1	
C2010	ECQM1H102KV	POLYESTER 50V 0.001	1	
	OR ECQM1H102KZ	POLYESTER 50V 0.001		
C2011	VCYSACR562NX	CERAMIC 16V 0.0056 $\pm 30\%$	1	
C2012	ECEA1HK0R1	ELECTROLYTIC 50V 0.1	1	
C2013	ECEA0JK470	ELECTROLYTIC 6.3V 47	1	
C2014	ECEA0JS221	ELECTROLYTIC 6.3V 220	1	
	OR ECEA0JU221	ELECTROLYTIC 6.3V 220		
C2015	VCYSACR472NX	CERAMIC 16V 0.0047 $\pm 30\%$	1	
C2016	ECQM1H273KV	POLYESTER 50V 0.027	1	
	OR ECQM1H273KZ	POLYESTER 50V 0.027		
C2017	ECQV05274JZ	POLYESTER 50V 0.27 $\pm 5\%$	1	
	OR ECQV1H274JZ	POLYESTER 50V 0.27 $\pm 5\%$		
C2018	VCYSACR472NX	CERAMIC 16V 0.0047 $\pm 30\%$	1	
C2019	ECEA1HK010	ELECTROLYTIC 50V	1	
C2020	VCYSACR182NX	CERAMIC 16V 0.0018 $\pm 30\%$	1	
C2021,2022	ECEA1CS100	ELECTROLYTIC 16V 10	2	
	OR ECEA1CU100	ELECTROLYTIC 16V 10		
C2023	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
	OR ECEA0JU470	ELECTROLYTIC 6.3V 47		
C2024	VCYW1E223KX	CERAMIC 25V 0.022	1	
C2025	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
	OR ECEA0JU470	ELECTROLYTIC 6.3V 47		
C2028-2030	ECEA1HN2R2S	ELECTROLYTIC 50V 2.2	3	
C2031	ECEA1CS101	ELECTROLYTIC 16V 100	1	
	OR ECEA1CU101	ELECTROLYTIC 16V 100		
C2032	VCYSACR682NX	CERAMIC 16V 0.0068 $\pm 30\%$	1	
C2033	ECEA1CS221	ELECTROLYTIC 16V 220	1	
	OR ECEA1CU221	ELECTROLYTIC 16V 220		
C2034	VCYSACR102KB	CERAMIC 16V 0.001	1	
C2035	ECEA1ES3R3	ELECTROLYTIC 25V 3.3	1	
	OR ECEA1EU3R3	ELECTROLYTIC 25V 3.3		
C2036	ECEA1HSR22	ELECTROLYTIC 50V 0.22	1	
C2037	ECQM1H123KV	POLYESTER 50V 0.012	1	
	OR ECQM1H123KZ	POLYESTER 50V 0.012		
C2038	ECEA1CK100	ELECTROLYTIC 16V 10	1	
C2039	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
C2040	ECEA1HN010S	ELECTROLYTIC 50V	1	
C2041	ECEA1HS0R1	ELECTROLYTIC 50V 0.1	1	
	OR ECEA1HU0R1	ELECTROLYTIC 50V 0.1		
C2042	ECEA1CS100	ELECTROLYTIC 16V 10	1	
	OR ECEA1CU100	ELECTROLYTIC 16V 10		
C2043	VCYW1E152KX	CERAMIC 25V 0.0015	1	
C2044	VCYSACR222NX	CERAMIC 16V 0.0022 $\pm 30\%$	1	
C2045	ECQM1H563KV	POLYESTER 50V 0.056	1	
C2046	ECQM1H393KV	POLYESTER 50V 0.039	1	
C2048	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
	OR ECEA0JU470	ELECTROLYTIC 6.3V 47		
C2049	ECQV05224JZ	POLYESTER 50V 0.22 $\pm 5\%$	1	
	OR ECQV1H224JZ	POLYESTER 50V 0.22 $\pm 5\%$		
C2050	ECEA1HS2R2	ELECTROLYTIC 50V 2.2	1	
	OR ECEA1HU2R2	ELECTROLYTIC 50V 2.2		
C2051	VCYSACR102KB	CERAMIC 50V 0.001	1	
C3001	ECCW1H820JC5	CERAMIC 50V 82P $\pm 5\%$	1	
C3002	VCYSACR221KB	CERAMIC 50V 220P	1	
C3003	VCYSACR103NY	CERAMIC 16V 0.01 $\pm 30\%$	1	
C3004	ECCW1H820JC5	CERAMIC 50V 82P $\pm 5\%$	1	
C3005	ECEA1CKS220	ELECTROLYTIC 16V 22	1	
	OR ECEA1CK220	ELECTROLYTIC 16V 22		
C3006	VCYSACR103NY	CERAMIC 16V 0.01 $\pm 30\%$	1	
C3007	VCYW1C104MX	CERAMIC 16V 0.1 $\pm 20\%$	1	
C3008	ECEA1EKS4R7	ELECTROLYTIC 25V 4.7	1	
	OR ECEA1EK4R7	ELECTROLYTIC 25V 4.7		
C3009,3010	VCYSACR103NY	CERAMIC 16V 0.01 $\pm 30\%$	2	
C3011,3012	VCYSACR680KC	CERAMIC 50V 68P	2	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C3013	ECEA1EKS4R7	ELECTROLYTIC 25V 4.7	1	
	OR ECEA1EK4R7	ELECTROLYTIC 25V 4.7		
C3014	VCYSARH271KB	CERAMIC 50V 270P	1	
C3015	ECCWIH470JC5	CERAMIC 50V 47P +5%	1	
C3016	VCYSACR103NY	CERAMIC 16V 0.01 +30%	1	
C3017	VCYWC104MK	CERAMIC 16V 0.1 +20%	1	
C3018	ECCWIH560JC5	CERAMIC 50V 56P +5%	1	
C3019	ECCWIH220JC5	CERAMIC 50V 22P +5%	1	
C3020	ECCWIH181JC5	CERAMIC 50V 180P +5%	1	
C3021	VCYSARH681KB	CERAMIC 50V 680P	1	
C3022	VCYSACR103NY	CERAMIC 16V 0.01 +30%	1	
C3023	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
	OR ECEA0JU470	ELECTROLYTIC 6.3V 47		
C3024	ECQV05823JZ	POLYESTER 50V 0.082 +5%	1	
C3026	ECQV0563JZ	POLYESTER 50V 0.056 +5%	1	
	OR ECQV1H563JZ	POLYESTER 50V 0.056 +5%		
C3027	VCYSACR103NY	CERAMIC 16V 0.01 +30%	1	
C3028	ECEA1CS470	ELECTROLYTIC 16V 47	1	
	OR ECEA1CU470	ELECTROLYTIC 16V 47		
C3029	ECEA0JS471	ELECTROLYTIC 6.3V 470	1	
	OR ECEA0JU471	ELECTROLYTIC 6.3V 470		
C3030	VCYSARH681KB	CERAMIC 50V 680P	1	
C3032	ECEA0JS221	ELECTROLYTIC 6.3V 220	1	
	OR ECEA0JU221	ELECTROLYTIC 6.3V 220		
C3038	VCYWE1392KX	CERAMIC 25V 0.0039	1	
C3039	ECCRIH390JC5	CERAMIC 50V 39P	1	
C4001	VCYSACR102KB	CERAMIC 16V 0.001	1	
C4002	ECEA50M1R	ELECTROLYTIC 50V	1	
C4003	ECEA1AK330	ELECTROLYTIC 10V 33	1	
C4004	ECQB1H333KH	POLYESTER 50V 0.033	1	
	OR ECQB1H333KZ	POLYESTER 50V 0.033		
C4005	ECEA50ZK33	ELECTROLYTIC 50V 0.33	1	
C4006	VCYWE103KX	CERAMIC 25V 0.01	1	
C4007	ECEA1CK100	ELECTROLYTIC 16V 10	1	
C4008	ECEA1HK010	ELECTROLYTIC 50V	1	
C4009	VCYSACR102KB	CERAMIC 16V 0.001	1	
C4010	ECEA1CK100	ELECTROLYTIC 16V 10	1	
C4011	ECEA1HK010	ELECTROLYTIC 50V	1	
C4012	ECEA1CK100	ELECTROLYTIC 16V 10	1	
C4013	ECEA1CK220	ELECTROLYTIC 16V 22	1	
C4014	ECEA1HK01	ELECTROLYTIC 50V 0.1	1	
C4015	ECEA1CK100	ELECTROLYTIC 16V 10	1	
C4016	ECEA1AK330	ELECTROLYTIC 10V 33	1	
C4017	ECEA1CS330	ELECTROLYTIC 16V 33	1	
C4018	ECEA1HK01	ELECTROLYTIC 50V 0.1	1	
C4019	ECEA50ZK1	ELECTROLYTIC 50V 0.1	1	
C4020	VCYWE1E563KX	CERAMIC 25V 0.056	1	
C4021	ECEA50ZK22	ELECTROLYTIC 50V 0.22	1	
C4022	ECEA50ZK47	ELECTROLYTIC 50V 0.47	1	
C4023	ECEA1CS220	ELECTROLYTIC 16V 22	1	
C4024	ECCW2H221K2	CERAMIC 500V 220P	1	
C4025	ECQM2682KZ	POLYESTER 200V 0.0068	1	
C4026,4027	VCYSACR103MY	CERAMIC 16V 0.01 +20%	2	
C4028	ECEA1CS220	ELECTROLYTIC 16V 22	1	
C4029	VCYSACR471KB	CERAMIC 16V 470P	1	
C4030	VCYSACR103MY	CERAMIC 16V 0.01 +20%	1	
C4031	VCYS0001	MULTI FUNCTION 0.001	1	
C4032	ECEA1CK220	ELECTROLYTIC 16V 22	1	
C6001	ECEA1HS010	ELECTROLYTIC 50V	1	
C6002	ECEA0JS221	ELECTROLYTIC 6.3V 220	1	
C6003	VCYSACR103MY	CERAMIC 16V 0.01 +30%	1	
C6004	ECRHA020D11	TRIMMER 20P	1	
	OR MCVO3R200ER	TRIMMER 20P		
C6005	VCYSARH8R2KC	CERAMIC 50V 8.2P	1	
C6006-6008	VCYSACR103MY	CERAMIC 16V 0.01 +30%	3	
C6010	ECEA1CS100	ELECTROLYTIC 16V 10	1	
C6013	VCYSACR222NX	CERAMIC 16V 0.0022 +30%	1	
C6024	ECEA50ZK1	ELECTROLYTIC 50V 0.1	1	
C6028	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
C6030	VCYSACR103NY	CERAMIC 16V 0.01 +30%	1	FOR PV-1222,PV-1225

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C6031	VCYSARC103NY	CERAMIC 16V 0.01 +-30%	1	FOR PV-1230
C6033	ECEA1CSS221	ELECTROLYTIC 16V 220	1	
C6034	VCYSARH102KB	CERAMIC 50V 0.001	1	
C6037,6038	VCYSARC103NY	CERAMIC 16V 0.01 +-30%	2	
C6039	VCYWE1E273KX	CERAMIC 25V 0.027	1	
C6135	VCYSARC103NY	CERAMIC 16V 0.01 +-30%	1	
C7001	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
C7002	ECEA1CS220	ELECTROLYTIC 16V 22	1	
	OR ECEA1CU220	ELECTROLYTIC 16V 22		
C7003	ECCWIH103ZF5	CERAMIC 50V 0.01	1	
		+80%-20%		
C7004	ECEA1ES4R7	ELECTROLYTIC 25V 4.7	1	
	OR ECEA1EU4R7	ELECTROLYTIC 25V 4.7		
C7005	ECEA1CS470	ELECTROLYTIC 16V 47	1	
	OR ECEA1CU470	ELECTROLYTIC 16V 47		
C7006	ECCWIH103ZF5	CERAMIC 50V 0.01	1	
		+80%-20%		
C7007	ECQB1H103KZ	POLYESTER 50V 0.01	1	
	OR ECQM1H103KV	POLYESTER 50V 0.01		
	OR ECQM1H103KZ	POLYESTER 50V 0.01		
C7008	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
C7009	ECQB1H103KZ	POLYESTER 50V 0.01	1	
	OR ECQM1H103KV	POLYESTER 50V 0.01		
	OR ECQM1H103KZ	POLYESTER 50V 0.01		
C7010	ECEA1CS471	ELECTROLYTIC 16V 470	1	
	OR ECEA1CU471	ELECTROLYTIC 16V 470		
C7011	ECEA1ES3R3	ELECTROLYTIC 25V 3.3	1	
	OR ECEA1EU3R3	ELECTROLYTIC 25V 3.3		
C7012	ECCWIH101JC5	CERAMIC 50V 100P +5%	1	
C7013	ECEA1EN4R7S	ELECTROLYTIC 25V 4.7	1	
C7014	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
C7015	ECQB1H273KZ	POLYESTER 50V 0.027	1	
	OR ECQM1H273KV	POLYESTER 50V 0.027		
	OR ECQM1H273KZ	POLYESTER 50V 0.027		
C7017	ECEA0JS102	ELECTROLYTIC 6.3V 1000	1	
	OR ECEA0JU102	ELECTROLYTIC 6.3V 1000		
C7019	ECEA1ES100	ELECTROLYTIC 25V 10	1	
	OR ECEA1EU100	ELECTROLYTIC 25V 10		
C7020	ECEA50ZK1	ELECTROLYTIC 50V 0.1	1	
C7021,7022	ECCWIH180JC5	CERAMIC 50V 18P +5%	2	
C7023	ECEA1HS010	ELECTROLYTIC 50V	1	
	OR ECEA1HU010	ELECTROLYTIC 50V		
		COILS		
L1002	VLQS0009		56	1
	OR VLQS11H560M		56 +20%	
L1003	VLQS0006		22	1
	OR VLQS09H220M		22 +20%	
L1004	VLQS0007		100	1
	OR VLQS09H101K		100	
L1007	VLQS05H4R7K		4.7	1
L1008	VLQS05R220K		22	1
	OR VLQS66R220K		22	
L3001	VLQS05R820K		82	1
	OR VLQS66R820K		82	
L3002	VLQS05R181K		180	1
	OR VLQS66R181K		180	
L3003	VLQS05R101K		100	1
	OR VLQS66R101K		100	
L3004	VLQS05R120K		12	1
	OR VLQS66R120K		12	
L3005,3006	VEKS1358		2	2
L3007	VLQS05R390K		39	1
	OR VLQS66R390K		39	
L3008	VLQS05R470K		47	1
	OR VLQS66R470K		47	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R7312, 7313	ERDS2TJ102		1K 2	
VR7301	EWELJ2A00B24	VARIABLE	20K 1	
		CAPACITORS		
C7301	VCYST16103NY	CERAMIC 16V 0.01 +-30%	1	
C7302	ECQM1H333KV	POLYESTER 50V 0.033	1	
C7303	VCYST25332NX	CERAMIC 25V 0.0033 +-30%	1	
C7304	ECEB1CK100	ELECTROLYTIC 16V 10	1	
C7305	ECQM1H103KV	POLYESTER 50V 0.01	1	
C7306	VCYST25332NX	CERAMIC 25V 0.0033 +-30%	1	
		SWITCHES		
SW7301	VSS80025	SELECT	1	
SW7302-7313	EVQ-QJ104K	PUSH	12	
		MISCELLANEOUS		
	T18S	FASTENER	1 (A), (C)	
	VMDS0224	LED HOLDER	1 (A), (C)	
	VMDS0137	LED SPACER	1 (B)	
		CAPSTAN MOTOR DRIVE C.B.A		
		INTEGRATED CIRCUITS		
IC2601	AN3821K		1	
	OR AN3822K			
		RESISTORS		
R2601	ERX12AMJR68	METAL OXIDE 1/2W 0.68	1	
R2602	ERDS2TJ102		1K 1	
R2603	ERDS2TJ123		12K 1	
R2604	ERDS2TJ124		120K 1	
R2605	ERDS2TJ180		18 1	
R2606-2608	ERDS2TJ224		220K 3	
		CAPACITORS		
C2601	ECEA1CSS101	ELECTROLYTIC 16V 100	1	
C2602	ECQM1H473KV	POLYESTER 50V 0.047	1	
	OR ECQM1H473KZ	POLYESTER 50V 0.047		
C2603	ECEA1HK010	ELECTROLYTIC 50V 1	1	
C2604-2606	ECEA1EKN2R2	ELECTROLYTIC 25V 2.2	3	
C2607-2609	ECKFIH472ZF	CERAMIC 50V 0.0047	3	
		+80%-20%		
		MISCELLANEOUS		
	TYB-23M	FASTENER	1	
		LINE FILTER C.B.A		
		RESISTORS		
R1025	ERX12ZGK275	SOLID 1/2W 2.7M +-10%	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		CAPACITORS		
C1001, 1002	PCX80004	CERAMIC 0.01	2	
	OR VCR80005	CERAMIC 0.01		
		FILTERS		
L1001	ELF18D314		1	
	OR VLOS0002			
		FUSE		
F1001	XBA1C16NU100		1.6A 1	
		MISCELLANEOUS		
	TJC6320	FUSE HOLDER	1	
	VJHS0019	IF PACK LEAD PIN	1	
	VMZS0126	LINE FILTER C.B.A BARRIER	1	
		LUMINANCE C.B.A		
		INTEGRATED CIRCUITS		
IC3101	AN3210K		1	
IC3102	AN3320K		1	
		DIODES		
D3101, 3102	MA165		2	
	OR 1SS119			
D3104	EQAO2-06	ZENER	1	
	OR EQAO2-07	ZENER		
	OR RD6.2EB	ZENER		
	OR RD6.8EB	ZENER		
		RESISTORS		
R3101-3103	EVNE4AA00B54	VARIABLE 50K	3	
R3104	EVNE4AA00B14	VARIABLE 10K	1	
R3105	ERDS2TJ103		10K 1	
R3106	ERDS2TJ122		1.2K 1	
R3107	ERDS2TJ563		56K 1	
R3109, 3110	ERDS2TJ332		3.3K 2	
R3111	ERDS2TJ822		8.2K 1	
R3112	ERDS2TJ821		820 1	
R3113	ERDS2TJ681		680 1	
R3114	EVNE4AA00B54	VARIABLE 50K	1	
R3115	ERDS2TJ102		1K 1	
R3116	ERDS2TJ272		2.7K 1	
R3117	ERDS2TJ103		10K 1	
R3118, 3119	ERDS2TJ391		390 2	
R3120, 3121	ERDS2TJ122		1.2K 2	
R3122	ERDS2TJ562		5.6K 1	
R3123	EVNE4AA00B24	VARIABLE 20K	1	
R3125	ERDS2TJ182		1.8K 1	
R3126	ERDS2TJ152		1.5K 1	
R3127	ERDS2TJ182		1.8K 1	
R3128	ERDS2TJ471		470 1	
R3129	ERDS2TJ151		150 1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R8125	ERDS2TJ102		1K 1	
R8126	ERDS2TJ271		270 1	
R8127	ERDS2TJ102		1K 1	
R8129	ERDS2TJ822		8.2K 1	
R8130	ERDS2TJ183		18K 1	
R8131	ERDS2TJ562		5.6K 1	
R8132	ERDS2TJ561		560 1	
R8133	ERDS2TJ273		27K 1	
R8134	ERDS2TJ153		15K 1	
R8135	ERDS2TJ561		560 1	
R8136	ERDS2TJ472		4.7K 1	
R8137	ERDS2TJ821		820 1	
R8138	ERDS2TJ472		4.7K 1	
		CAPACITORS		
C8101,8102	VCYSARC103NY	CERAMIC 16V 0.01 +30%	2	
C8103	VCYW1E183KX	CERAMIC 25V 0.018	1	
C8104	VCYSARH680J	CERAMIC 50V 68P +5%	1	
C8105,8106	VCYSARH121KB	CERAMIC 50V 120P	2	
C8107	VCYSARC103NY	CERAMIC 16V 0.01 +30%	1	
C8108	ECEA1HS010	ELECTROLYTIC 50V 1	1	
	OR ECEA1HU010	ELECTROLYTIC 50V 1		
C8109	ECEA0JS470	ELECTROLYTIC 6.3V 47	1	
	OR ECEA0JU470	ELECTROLYTIC 6.3V 47		
C8110	VCYSARH5R6KC	CERAMIC 50V 5.6P	1	
C8111	MCV03R200ER	TRIMMER 20P	1	
C8112	VCYSARH102KB	CERAMIC 50V 0.001	1	
C8113	ECEA0JS221	ELECTROLYTIC 6.3V 220	1	
	OR ECEA0JU221	ELECTROLYTIC 6.3V 220		
C8114	VCYSARC103NY	CERAMIC 16V 0.01 +30%	1	
C8115	VCYSARH102KB	CERAMIC 50V 0.001	1	
C8116	VCYSARC103NY	CERAMIC 16V 0.01 +30%	1	
C8117	VCYW1C104MX	CERAMIC 16V 0.1 +20%	1	
C8118,8119	VCYSARC103NY	CERAMIC 16V 0.01 +30%	2	
C8120	VCYSARC222NX	CERAMIC 50V 0.0022 +30%	1	
C8121	VCYSARC103NY	CERAMIC 16V 0.01 +30%	1	
C8122	VCYW1C104MX	CERAMIC 16V 0.1 +20%	1	
C8123-8130	VCYSARC103NY	CERAMIC 16V 0.01 +30%	8	
C8131	VCYSARH680J	CERAMIC 50V 68P +5%	1	
C8132	VCYSARH271KB	CERAMIC 50V 270P	1	
C8133	VCYSARH680J	CERAMIC 50V 68P +5%	1	
C8134	VCYSARC472NX	CERAMIC 16V 0.0047 +30%	1	
C8135	VCYSARH680J	CERAMIC 50V 68P +5%	1	
C8136	VCYSARH220J	CERAMIC 50V 22P +5%	1	
C8137	ECEA1ES3R3	ELECTROLYTIC 25V 3.3	1	
	OR ECEA1EU3R3	ELECTROLYTIC 25V 3.3		
C8138	ECEA1ES4R7	ELECTROLYTIC 25V 4.7	1	
	OR ECEA1EU4R7	ELECTROLYTIC 25V 4.7		
C8139	VCYW1C104MX	CERAMIC 16V 0.1 +20%	1	
C8140	VCYSARH150JC	CERAMIC 50V +5%	1	
C8141	VCYSARH151KB	CERAMIC 50V 150P	1	
		DELAY LINE		
DL8101	EFDVN645B15G		1	
		FILTER		
FL8101	VLFS0008		1	
		COILS		
L8101	VLQS05R471K		470 1	
L8102	VLQS05R221K		220 1	
L8103	VLQS05R331K		330 1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
L8104,8105	VLQS05R101K		100 2	
L8106,8107	VLQS05R181K		180 2	
L8108	VLQS05R102K		1MH 1	
	OR VLQS66R102K		1MH	
L8109	VLQS05R470K		47 1	
		CRYSTALS OSCILLATOR		
X8101	VXSX0003		1	
	OR VXSX0060			
		MISCELLANEOUS		
	VJHS0046	PACK LEAD PIN	1	
		TV DEMODULATOR UNIT		
		INTEGRATED CIRCUITS		
IC701	AN5135K		1	
		TRANSISTORS		
Q701	2SC2188		1	
Q702	2SD637(Q,R)		1	
		DIODE		
D701	MA27T-B		1	
		RESISTORS		
R702,703	ERDS2TJ562		5.6K 2	
R704	ERDS2TJ271		270 1	
R705	ERDS2TJ221		220 1	
R706,707	ERDS2TJ821		820 2	
R708	ERDS2TJ561		560 1	
R709	ERDS2TJ470		47 1	
R710	ERDS2TJ122		1.2K 1	
R711	ERDS2TJ474		470K 1	
R712	ERDS2TJ183		18K 1	
R713	ERDS2TJ221		220 1	
R714	ERDS2TJ821		820 1	
R715	AVNE4AA0B223	VARIABLE	22K 1	
	OR			
	EVNE4AA00B24	VARIABLE	20K	
R716	ERDS2TJ471		470 1	
R718	AVNE4AA0B103	VARIABLE	10K 1	
	OR			
	EVNE4AA00B14	VARIABLE	10K	
R719	ERDS2TJ272		2.7K 1	
R720	ERDS2TJ680		68 1	
R721	ERDS1TJ680		1/2W 68 1	
R722	ERDS1TJ101		1/2W 100 1	
R723	ERDS2TJ101		100 1	
R724	ERDS2TJ562		5.6K 1	
R726	ERDS2TJ222		2.2K 1	
R727	ERDS2TJ102		1K 1	
R729	ERDS2TJ681		680 1	
R731	ERDS2TJ104		100K 1	
R732	ERDS2TJ222		2.2K 1	
R734	ERDS2TJ102		1K 1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R735,736	ERDS2TJ152	1.5K	2	
		CAPACITORS		
C701-704	VCYSACR103MY	CERAMIC 16V 0.01 +-20%	4	
C705	ECEA1CK330	ELECTROLYTIC 16V	33	1
C706,707	VCYSACR103MY	CERAMIC 16V 0.01 +-20%	2	
C708	ECQV05474JB	POLYESTER 50V 0.47 +-5%	1	
	OR ECQV1H474J2	POLYESTER 50V 0.47 +-5%		
C709	VCYSACR103MY	CERAMIC 16V 0.01 +-20%	1	
C710	ECEA1HK010	ELECTROLYTIC 50V	1	1
C713	VCYSACR103MY	CERAMIC 16V 0.01 +-20%	1	
C715	ECCW1H180JC5	CERAMIC 50V 18P +-5%	1	
C716	ECCW1H101KB5	CERAMIC 50V 100P	1	
C717	ECCW1H820JR5	CERAMIC 50V 82P +-5%	1	
C718	ECCW1H120JC5	CERAMIC 50V 12P +-5%	1	
C719	ECCW1H220JC5	CERAMIC 50V 22P +-5%	1	
C720,721	ECQV05473J2	POLYESTER 50V 0.047 +-5%	2	
	OR ECQV1H473J2	POLYESTER 50V 0.047 +-5%		
C722	ECEA1HCR47	ELECTROLYTIC 50V 0.47	1	
C723	ECEA1CK470	ELECTROLYTIC 16V	47	1
C726	ECCW1H040CC5	CERAMIC 50V 4P +-0.25P	1	
C727	ECQM1H223KV	POLYESTER 50V 0.022	1	
C728	ECCW1H560JC5	CERAMIC 50V 56P +-5%	1	
C729	ECEA1EK47	ELECTROLYTIC 25V 27P +-5%	1	
C731	ECCW1H270JC5	CERAMIC 50V 27P +-5%	1	
C733	ECEA1HK010	ELECTROLYTIC 50V	1	1
C734	VCYSACR103MY	CERAMIC 16V 0.01 +-20%	1	
C736	ECCW1H560JC5	CERAMIC 50V 56P +-5%	1	
		FILTERS		
FL701	EFCS4R5MS4	CERAMIC	1	
FL702	EFCS4R5MW3	CERAMIC	1	
	OR TFCS4R5MW3	CERAMIC		
FL703	VLFS0006		1	
FL704	VXS0004		1	
		COILS		
L702	ELQR82KB	0.82	1	
	OR TLQR82N205C	0.82		
L703	VLQS66R4R7K	4.7	1	
L705	ELQR47KB	0.47	1	
	OR TLQR47N205C	0.47		
L706	VLQS66R120K	12	1	
L707	VLQS66R680K	68	1	
L708	VLQS66R4R7K	4.7	1	
L709	VLQS66R470K	47	1	
L710	VLQS66R680K	68	1	
L712	VLQS66R220K	22	1	
		TRANSFORMERS		
T701	EIV7EF002B		1	
T702	EIV7EF001B		1	
		MISCELLANEOUS		
	VJHS0045	PACK PIN	3	
	VSCS0389	SHIELD CASE	1	
	VSCS0390	SHIELD CASE	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	TJE98101	CHECK TERMINAL	50	
	TNV56751F2R	TUNER	1	(A)
	TNV76775F2R		1	(B), (C)
	VEJS0019	VHF BLOCK	1	
	VEKS1442	ANT CABLE	1	
	VEKS1443	RF CABLE	1	
	VEPS00269A	REEL SENSOR UNIT	1	
	VEQS0252	RF CONVERTER	1	
	VEQS0253	RF CONVERTER	1	
	VEQS0254	RF CONVERTER	1	
	VEQS0255	RF CONVERTER	1	
	VJAS0033	AC CORD	1	
	VJBS00202	TAKE UP PHOTO TR P.C.B	1	
	VJBS00239	SUPPLY PHOTO TR P.C.B	1	
	VJBS00296	CONNECTION P.C.B	1	
	VJES0007	CHECK TERMINAL	45	
	VJJS0056	ANT TERMINAL PLATE	1	
	VJR3	CLAMPER	1	
	VLTS0002	BALLOON CORE	1	
	VMA0783	AC CORD ANGLE	1	
	VMKS0333	REEL SENSOR SPACER	1	
	VSCS0283	ANT COVER	1	
	VXS0342	SENSOR LED UNIT	1	
	XNG3	M3 NUT	1	
	XYN3+F12FS	SCREW WITH WASHER 3X12	1	
	XYN3+F6S	SCREW WITH WASHER 3X6	1	
IC1551	ON2160	INTEGRATED CIRCUIT	1	
Q1551,1552	PN150NV	PHOTO TRANSISTOR	2	
R1551	ERDS2TJ100	RESISTOR CARBON 10	1	
SW1551	VESS0016	MODE SELECT SWITCH	1	
SW1552	VSHS0008	CASSETTE DOWN LEAF SWITCH	1	
SW1553	VSMS0007	SAFETY SWITCH	1	
		WIRED TRANSMITTER C.B.A		
		RESISTORS		
R6601	ERD25TJ362	3.6K	1	
R6602	ERD25TJ752	7.5K	1	
R6603	ERD25TJ153	15K	1	
		SWITCHES		
SW6601-6603	EVQ-QJ104-K		3	
SW6605	EVQ-QJ104-K		1	